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JOURNAL OF THE PROCEEDINGS

OF THE

LINNEAN SOCIETY OF LONDON

On *Cygnus Passmori*, a supposed new American Swan.

By the Rev. W. Hincks, F.L.S., Prof. Nat. Hist. Univ. of Toronto.

[Read January 21, 1864.]

Mr. Passmore, taxidermist, of Toronto, who is an experienced and intelligent observer of the objects which his occupation brings under his notice, obtained a Swan during the last winter, which appeared to him so remarkable that he called my attention to it, and requested my opinion as to the species to which it belongs. On examining it with care, I came to the conclusion that it has not yet been described; and although the comparison of further specimens would be very desirable, I venture to lay the observations I have made before the Linnean Society, and to name the new species, from its discoverer, *Cygnus Passmori*.

I regret that I did not see the bird until after it had been prepared, when it was no longer possible to obtain all the measurements which I should wish to give; but as the sternum, with the trachea, was placed in my hands, and I had also two specimens of the same parts taken from the *Cygnus buccinator*, I find myself able to give abundantly sufficient characters, accompanied by an interesting correction of the labours of my predecessors.

The Swan which I now introduce to the notice of naturalists resembles in its general aspect *Cygnus buccinator* of Richardson, having, like it, the beak, legs, and feet black, and a little colour on the plumage of the head and upper parts of the neck; but the new species, though our specimen is apparently a mature bird, is considerably lighter and smaller in size, and the colour is a light dirty grey, slightly tinged with ferruginous about the crown. The same grey tinge is also seen on the tips and inner webs of the quill-feathers of the wings. The prominence of the forehead between the eyes is subangular; and there is a difference, best expressed by a figure, in the course of the line bounding the beak from the eye to the opening of the mouth. In these remarks, I assume that the name *Cygnus buccinator* must continue to be given to the Great Northern Swan, our commonest species, which, from its peculiar cry, is popularly called the *Trumpeter*, notwithstanding that two species have been for a time included under the one name, and that it happens that the sternum and trachea communicated by Sir John Richardson to Mr. Yarrell, and by him described and figured in the 17th volume of the Society's 'Transactions' (pp. 1–4, tab. 1), appear to have belonged to a specimen of the new species, and the very remarkable corresponding parts of the true *Cygnus buccinator* remain, so far as I can ascertain, as yet undescribed. If I am right in conjecturing that the peculiarities to be pointed out in the trachea are immediately connected with the distinguishing cry of the bird which has given cause for the specific name, and in supposing that Sir J. Richardson's description was probably made from a true Trumpeter, though the trachea procured was obtained from one of a species then confounded with it—that at least the preserved specimen referred to by Mr. Yarrell in his description must have been a Trumpeter—I think I shall be justified in applying the received name to the bird to which it is most appropriate, and bestowing a new one on the smaller species now first distinguished. When, having carefully noted the wide difference between the sternum and trachea in the two species under comparison, I turned to Mr. Yarrell's figure already referred to, it was with no small surprise that I found it corresponded very nearly with what I took to be the trachea of the new species, instead of that of the true Trumpeter. My first impression was that wrong marks might have been affixed to the specimens, or that I might have confused them, although the comparative size made this improbable; but on consulting Mr. Passmore, he was able to remove all doubt by producing the sternum of a second Trumpeter, procured at the same time with that in my hands; and, being a female, its agreement with that previously examined proved that the specimens were from the first rightly referred, and that, in fact, Mr. Yarrell's figure belongs to our new species, not to the true *C. buccinator* as we understand it. Comparing my sternum of *Cygnus Passmori* with Mr. Yarrell's figure and description, it appears that the bony protrusion at the anterior extremity of the inner face of the sternum is somewhat less solid and less compressed laterally in mine, and that the fold of the trachea within the hollow carina does not advance so far in mine as in Mr. Yarrell's, both which circumstances are explained by his bird being the older; but the resemblance is too close to admit a doubt of specific identity. I proceed, then, to describe the sternum and trachea of what I regard as the true *C. buccinator*. In this, as in the preceding case, the trachea descends without changing its course, passing between the branches of the furcula until it reaches the level of the carina, when it bends backwards and enters between the bony plates of the carina. Proceeding backwards and inwards, it rises above the level of the inner face of the sternum, making a wide bow, which is covered by the bone of the inner surface of the posterior portion of the sternum, as represented in Mr. Yarrell's figure of the sternum of *Cygnus Bewickii* (Transactions, vol. xvi. tab. 25. fig. 3) and in the accompanying drawings. But in *C. buccinator* the rise of the trachea from the carina is more sudden, so that there are very slight traces of a rising over its course until the commencement of the bow, which is also larger than it is represented in *C. Bewickii*: and the returning fold of the trachea, instead of immediately passing out as in *C. Bewickii*, rises into a protuberance at the anterior extremity of the sternum, of the same kind with that of *C. Passmori*; but, instead of rising only, as in that species, *to the level of* the vertical bone of the sternum, it rises *an inch above it*, with a decided inclination to the right side, looking forward. Within this extraordinary protuberance the trachea bends round, and, as it descends, comes out under the arch of the furcula, the exterior portion being manifestly enlarged, and having much broader rings, contracting again laterally as it approaches the bone of divarication (see fig. 8). The bronchiæ had been destroyed in both specimens of the sternum and trachea of *C. buccinator* before they came into my hands; but they are described as abruptly much swollen close to the bone of divarication, with the tubes shorter than in *Cygnus Passmori*. The figure of the sternum itself also seems to differ in the two species, the angular enlargements at each side of the anterior arch on the interior surface being much more distinct in *C. Passmori,* and the sinuses at each side of the posterior extremity, which are deep and well defined in *C. Passmori,* being very obscure in *C. buccinator,* as if the large swelling over the trachea interfered with them.

I add a few comparative measurements, and have endeavoured faithfully, though rudely, to represent by figures some points of comparison amongst the North American species of *Cygnus.*

The weight of *C. Passmori* was 18 lbs., whilst that of a medium specimen of *C. buccinator* which was compared with it was 30 lbs.

		inches.
The length, from the tip of the beak to the end of the tail, of	*C. Passmori*	51
	C. buccinator	60
Length of the head in the line of the meeting of the mandibles	*C. Passmori*	7¼
	C. buccinator	9½
Back of the eye to tip of the beak . .	*C. Passmori*	5
	C. buccinator	5¾
Hind point of the nostril to tip of the beak	*C. Passmori*	2
	C. buccinator	3
Length of sternum	*C. Passmori*	8
	C. buccinator	8½
Width near the posterior end	*C. Passmori*	4
	C. buccinator	4½
Greatest width of the heart-shaped elevation on the posterior portion of the sternum in	*C. buccinator*	3½
Length of the same		4

The value of some of these differences can only be determined by repeated trials, but they furnish materials not undeserving of notice.

I believe the ferruginous colour on the head and upper portion of the neck of *C. buccinator* is constant and very characteristic of the species, and it is probably more widely diffused and conspicuous in the younger birds; yet our smaller bird has scarcely any of the ferruginous tint, which is replaced by very pale grey, whilst the wing-feathers, which are pure white in *C. buccinator*, are tipped in *C. Passmori* with a faint fawn-colour. I have mentioned the angular forehead of *C. Passmori*; whilst that of *C. buccinator* has the prominence wider and curved, and in *C. Americanus* it is a much shallower and more open curve. I wish to observe this character in the fresh specimen, lest it should be in any degree affected by the taxidermist's proceedings; but I am disposed to confide in it.

In *C. Passmori* the naked black skin reaches the eye, but does not surround it as in *C. buccinator*, where a narrow black border encloses the eye.

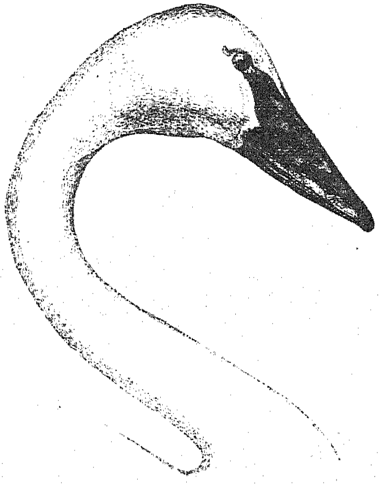
In conclusion, I propose the following character for *C. Passmori*:

CYGNUS PASSMORI, *Hincks*. Albus, capite, cervice et pennarum extremitatibus pallide cinereis, rostro etuberculato et pedibus nigris, fronte subangulatim prominente, trachea intra carinæ parietes et sterni tumorem anteriorem uncialem flexa.

To Sir J. Richardson's character of *Cygnus buccinator* I propose to add:—

Fronte curvatim prominente, trachea intra parietes carinæ flexa, anfractum cordiformem paulum intumescentem faciente parte posteriore sterni, tunc tumorem alterum biuncialem dextrorsum inclinatum parte anteriore.

The accompanying figure of the head and neck is taken from a photograph by Mr. Octavius Thompson, of Toronto, from the only specimen yet obtained of *Cygnus Passmori*; and I am indebted for the drawings of the sternum of *Cygnus buccinator* to my friend Charles Fuller, Esq., of Toronto.



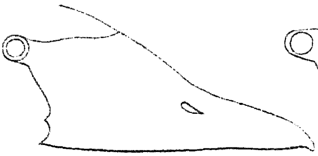
EXPLANATION OF THE FIGURES.

Fig. 1. Side view of the beak of *Cygnus Passmori*, natural size.

Fig. 2. Similar view of the beak of *Cygnus buccinator*.

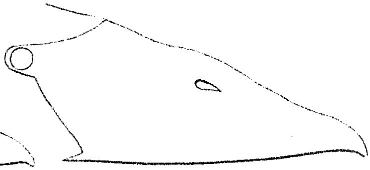
Figs. 3, 4, & 5. Diagrams showing the different figure of the forehead in the three American species of Swan.

Fig. 1.



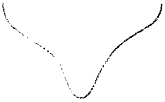
Cygnus Passmori.

Fig. 2.



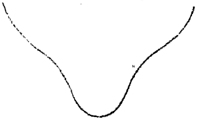
Cygnus buccinator.

Fig. 3.



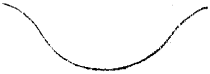
C. *Passmori.*

Fig. 4.



C. *buccinator.*

Fig. 5.



C. *Americanus.*

Fig. 6.

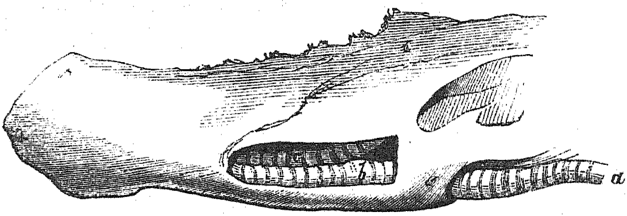


Fig. 7.

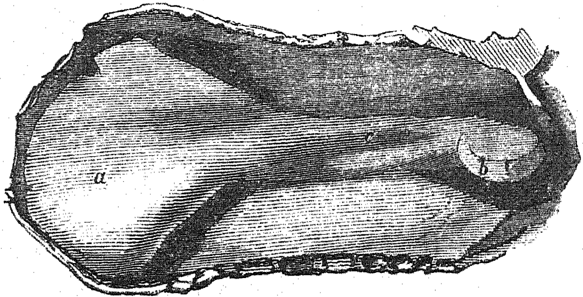


Fig. 8.

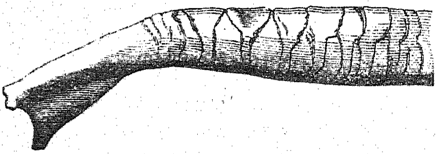


Fig. 6. Sternum of *Cygnus buccinator*, laid on its side; a portion of the bone of the hollow carina being removed, to show the course of the trachea.

a. The trachea entering the carina.

b. The same, just reaching the place where it rises into the projection at the posterior part of the sternum.

c. The trachea returning from the wide bow formed at the posterior part of the sternum, and bending upwards to enter the tumour after a flexure, within which it proceeds outward and upwards in the usual manner.

Fig. 7. Inner surface of the sternum of *Cygnus buccinator*, reduced to the proportion of three to five, showing

a. The cordiform enlargement, formed by a horizontal flexure of the trachea, and raised half an inch from the general level of the sternum.

b. The tumour at the anterior extremity of the sternum, rising two inches above the level, and one inch above the vertical bone, which the tumour in *C. Passmori* only equals in height.

c. The course of the trachea manifested externally, but without any elevation, the part about *c* being on the level of the surface of the sternum.

The figure represents the sternum lying on its side, with the inner surface to the observer, the light coming from the posterior end.

Fig. 8. Upper portion of the trachea, with the bone of divarication, showing the broad rings and the mode in which they meet one another.

[Read May 5, 1864.]

Note.—The following is extracted from a letter received from Mr. Hincks since his paper was read:—

"Toronto, April 10th, 1864.

"During this winter I have made great efforts to obtain specimens throwing light upon the character of my supposed new species; and though the season has not been very favourable for bringing Swans our way, I have succeeded in obtaining two young male Swans with the entirely black beak of *Cygnus buccinator*, whose sternum I have carefully examined. I take them both to be younger birds than those previously in my possession; and I am in doubt whether, beginning with the younger, and placing our *C. Passmori* as part of the series, we have not a succession of degrees of development according to age, leading up to the condition of the trachea in what I have sent as the true *C. buccinator*. This supposition assumes that the trachea *extends with age*, that it enters the hollow carina of the sternum, and soon shows a tendency to a *double bend*; that the pressure of the trachea on the bone of the sternum would modify *its* (*the bone's*) shape (as physiologists will readily acknowledge it might do), and that the singular bony enlargements on the posterior face of the sternum and in the bumps or knobs at the sternal edge, as seen in the drawing sent, mark the ultimate development of the trachea; whilst the state of the trachea in the sternum sent by Sir John Richardson to Mr. Yarrell, and which I now assign to *C. Passmori*, may be a less advanced form of the same structure, and those I have since examined may be still younger forms of the same species.

"It may be, indeed, that the specimens since examined are younger specimens of *C. Passmori*, and that the true *C. buccinator* is less common, or at least a more northern form; but I think it right to indicate the doubt which I feel myself respecting the new species, leaving the facts for the consideration of better judges. I thought I followed excellent authority in considering such a difference in the trachea as a sufficient mark of a distinct species; but the facts will not be less interesting to ornithologists if they see reason for using such characters with greater caution in future. At present, I must leave the value of my distinctions as a subject for further inquiry, with as little wish to press an unnecessary specific name as to leave interesting facts unrecorded.

"W. HINCKS."

Description of a new British Annelide, belonging to the Tribe RAPACEA of Grube=*Annelida errantia* of Milne-Edwards. By W. BAIRD, M.D., F.L.S.

(Plate I.)

[Read April 21, 1864.]

Fam. NEREIDIDÆ.

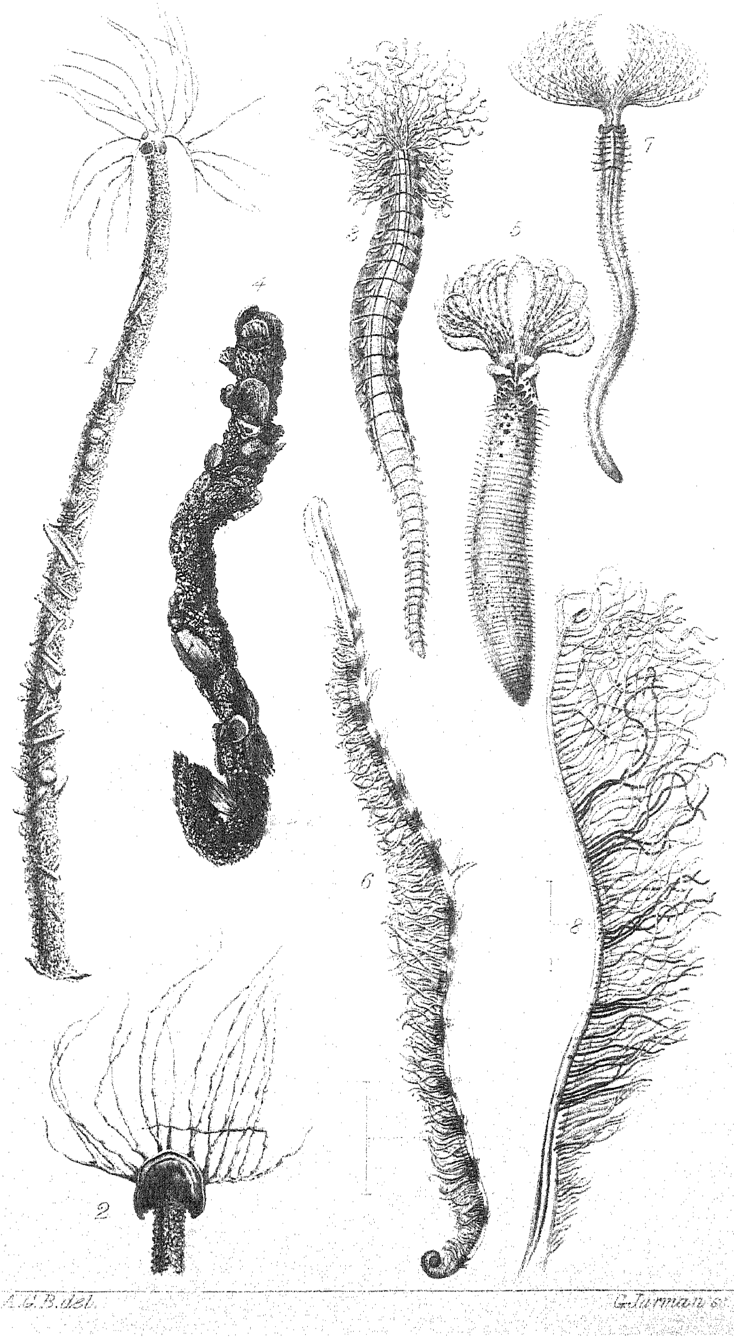
Gen. HETERONEREIS.

HETERONEREIS SIGNATA, *Baird.* (Pl. I. figs. 1, 1 *a–c*.)

Char. Corpus pyramidatum, maculatum, dorso et ventre canaliculatum. Segmenta 2ndum, 3rtium, 4tum et 5ntum brevissima; segmenta sexdecim sequentia magna, pedibus validis, simplicibus; segmenta partis posterioris corporis parva, confertim disposita, pedibus parvis, compositis; cirri pedum anteriorum simplices, non crenati.

Hab. Polperro, Cornwall; in fundo limoso. (Mus. Brit.)

The body of this Annelide (Pl. I. fig. 1) is nearly 3 inches long, consisting of about 106 segments. The anterior portion is



A.G.B. del.

G. Jarman sc.

about one-third the whole length and is composed of 21 segments, the posterior containing 85. In form it tapers gradually from the head to the tail, which terminates in a blunt point without cirri. The dorsal surface is beautifully marked with dark-purple spots, which extend over the upper part of the feet, leaving a hollow space in the centre free from them. The anterior portion of the body is convex, the lower flattened. The segments of the anterior part are of considerable size, but those of the lower are small and very much crowded together. A canal runs down the ventral surface the whole length, while a similar one runs down the dorsal surface of the anterior portion only, beginning at the sixth or seventh segment and continuing to the twenty-first. The head is rather small; the first segment of the body of moderate size, and the four succeeding ones very narrow (fig. 1 *d*), the first nearly equalling the three following. The tentacular cirri are equal in length to about the four first segments. The feet of the anterior portion of the body (fig. 1 *a*) are all simple lobulated feet, without any foliaceous branchial lamina. The dorsal lobe is short, stout, and rounded at the apex, with a cirrus springing from near its root, about one-third longer than the lobe itself, and not crenated underneath. The ventral lobe is somewhat larger than the dorsal, and the cirrus attached to it is very short, not quite half the length of the lobe. The bristles attached to it are of two kinds: those especially attached to the lobe nearest the dorsal lobe (the superior fascicle) are all slender, compound, with a sharp-pointed smooth style inserted into a stouter cylindrical shaft which is slightly striated (*setæ spinosæ*). The bristles of the inferior branch are bifasciculate, and consist of one bundle composed of spinous bristles like those above described, and another composed of stouter and rather shorter setæ with a striated slightly bent cylindrical shaft cut obliquely at the tip, to which portion is articulated a short claw-like piece, quite smooth, and slightly bent at the apex (*setæ falcatæ*). The aciculæ are stout and of a black colour. The posterior feet (fig. 1 *b*) are all much smaller than the anterior, but more complicated in structure. Above the base of the dorsal or superior lobe we find a compressed foliaceous lamella. The superior setiferous tubercle is also furnished with a similar lamina, but very large, extending across the middle lobes of the foot. The ventral cirrus has appended beneath its base another foliaceous lamina of about the same size as that attached to the dorsal lobe. The cirri of these lobes are rather short, that of the dorsal lobe being longer than the lobe, while the ventral cirrus is shorter than its corresponding lobe. The bristles are of two kinds,—those of the setiferous tubercles being numerous, compound, and consisting of a flattened lancet-shaped blade, smooth and rather sharp-pointed, let into a somewhat cylindrical shaft which is striated half across (*setæ cultratæ*) (fig. 1 *c*). Mixed with these are a few (about four or five) long and stout setæ of the falcate kind, but much longer and stronger than those of the anterior feet.

The species which approaches nearest to this is the *Heteronereis renalis* of Johnston=*H. arctica* of Oersted. It differs, however, in many respects. The relative size of the first and four succeeding segments, the colour and peculiar markings of the body, the canal running down the centre dorsally and ventrally, the number of anterior segments (in *renalis* or *arctica* being only twenty, while in this species there are twenty-one), the posterior portion of the body being more slender, and the tail destitute of cirri, the structure of the feet and cirri, &c.,—all separate it from that species.

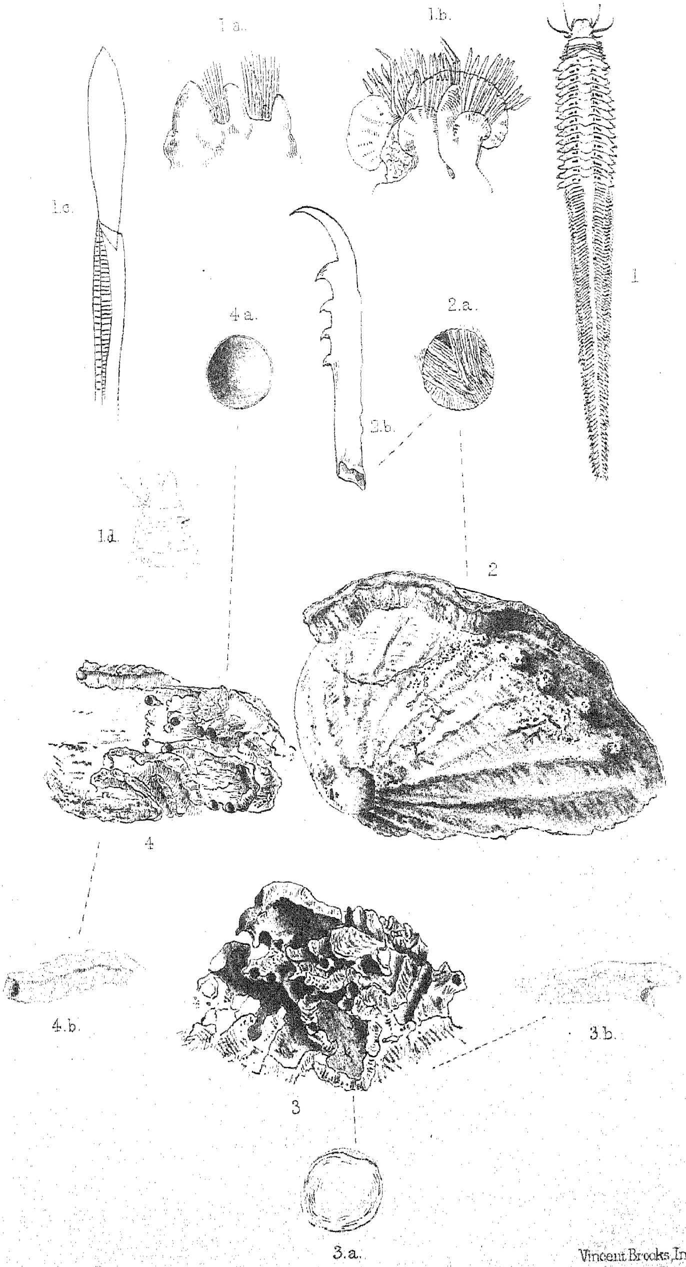
The only specimen which I have seen was found by Mr. Laughrin at Polperro, Cornwall, in a muddy bottom, and is now in the national collection, British Museum.

Description of several new Species and Varieties of Tubicolous Annelides=Tribe Limivora of Grube, in the Collection of the British Museum. By W. Baird, M.D., F.L.S.—Part I.

(Plate I.)

[Read April 21, 1864.]

In the extensive collection of Annelides belonging to the British Museum, now in course of arrangement, there is a considerable number which appear to me to be undescribed. In many cases these are difficult to determine, from the fact that soft animals preserved in spirits do not always retain their form and consistence, or may be so hardened by the spirits as to offer great difficulties in making out the different parts. In the case of the Tubicolous Annelides, again, perhaps only the tubes or cases in which the animals dwell have been preserved, and thus it is almost impossible to refer them to their proper genera. As, however, notwithstanding these difficulties, we possess many



Vincent Brooks, Imp.

species which can be determined, it is my intention, from time to time, to offer to the Linnean Society, if approved of, descriptions of such species as appear to me new or worthy of particular attention.

Family SERPULIDÆ.

The genus *Serpula* of Linnæus, as established by the illustrious Swede, contained several species now known to belong to the genus *Vermetus*, a genus of mollusks. After these were withdrawn, there still remained many forms of shelly tubes which, though bearing a general resemblance to each other, were difficult to be arranged under one single genus. The animals, however, the architects of these tubes, after a time began to be a little more studied; and thus Lamarck, Blainville, Savigny, and some other naturalists were enabled to construct, upon good grounds, several genera to contain what might otherwise have been considered similar forms. The last author who has paid particular attention to this Linnean genus is Dr. A. Philippi. His subdivisions of *Serpula* are founded upon a character which has been discovered by malacologists to be of great value in the class Mollusca. The animals of the greater number of the species of *Serpula* which have been described possess a similar organ to that which characterizes so many of the Gasteropodous Mollusca. This is the operculum, which varies considerably in structure in the different species, and which thus forms an excellent character for dividing them into genera. As Philippi justly observes, "this character has, moreover, the advantage that it may still be frequently observed in dried specimens preserved in museums."

Little dependence can be placed on the *shelly tube* alone in distinguishing the species or even the genera: thus we find a similar shell possessed by two or three different Annelides belonging to two or three distinct genera; for, as Philippi remarks in his paper*, "the shells of *Serpula triquetra*, *Vermilia triquetra*, and *Pomatoceros tricuspis* are difficult to distinguish without the animals."

The structure of the operculum is far more varied, indeed, than it had been hitherto supposed to be; and I think Dr. Philippi has done good service to the students of this group of Annelides by so carefully distinguishing the structure of this appendage. It is owing to the fact mentioned above (that the operculum frequently remains behind in dried specimens), that I have been enabled to add some new species, belonging to the national collection, not hitherto described. The number of genera characterized by Philippi belonging to the Serpulidæ is ten, and the species enumerated by him as occurring in the Mediterranean alone are twenty-five. Various other exotic species have been described at different times, and to these I now propose adding several more.

---

* Wiegmann's Archiv for 1844, Band i. p. 186. Translated into English by Dr. Francis, in Ann. & Mag. of Nat. Hist. 1844, vol. xiv. p. 153–162.

Genus EUPOMATUS, *Philippi* *.

1. EUPOMATUS BOLTONI, Baird. (Pl. I. figs. 2, 2*a*, *b*.)

Char. Animal (operculo excepto) ignotum. Operculum corneum, infundibuliforme, margine externo dense crenato, interne cuspidibus calcareis viginti dentatis instructum. Testa rubra, triquetra, adhærens, transversim rugosa, dorso canaliculata.

Hab. Nova Zelandia. (Mus. Brit.)

This is a fine species of the family Serpulidæ, of which, however, we have as yet only received the shelly tube and the operculum of the animal. In our national collection we possess three good specimens of the shell and three specimens of the operculum. This portion of the animal is large, and by means of it we can distinctly refer the species to the genus *Eupomatus* of Philippi. It is rounded, slightly funnel-shaped, and of a horny texture (Pl. I. fig. 2 *a*). Externally the margin is densely crenated—the crenations being about eighty-eight or ninety in number, and tooth-like. Internally it is provided with a considerable number (about twenty) of hard, flattened, calcareous spikes (or, as Philippi elsewhere calls them, horns, *cornua*), rising up from the centre and strongly dentate—these teeth being four or five in number, stout, rather blunt, and arranged on one side only (fig. 2 *b*). The spike itself terminates in a claw-shaped sharp point, slightly curved at the extremity. These spikes bear altogether an exact resemblance to the toothed extremity of the large claw of a lobster. The tube, in all the specimens which I have seen, is found attached to, and creeping on, dead shells (fig. 2). In one specimen, which, however, is not quite perfect at the posterior extremity, it is about three inches in length. It is of a red colour, triquetrous where attached, but round at the anterior extremity or mouth when the tube raises itself up from the shell upon which it creeps, is corrugated transversely (the striæ of growth?), and is marked with a large, distinct canal or furrow, running along the dorsal surface throughout its whole length.

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* The genus *Eupomatus* was constituted by Philippi to receive those species of *Serpula* that had the operculum furnished on the upper side, in the centre, with a certain number of moveable spikes. The operculum, he says, is horny, and in the Mediterranean species these spikes are horny also; but this latter character does not hold good in all the other species which have been described.

Of the three specimens we possess, one, the largest, is attached to part of the shell of *Haliotis australis*, another to a fragment of a species of *Mactra*, and the third is coiled round a species of *Elenchus*.

They were all collected in New Zealand by Lieut.-Col. Bolton, R.E., to whom I have dedicated the species.

Genus PLACOSTEGUS *, *Philippi.*

2. PLACOSTEGUS CARINIFERUS, *Gray* (sp.), *Baird.*

Numerous specimens of this species of Annelide were brought at different times from New Zealand, and deposited in the national collection, by the late lamented Dr. Andrew Sinclair, R.N., Lieut.-Col. Bolton, R.E., the late Captain Sir Everard Home, Bart., and His Excellency Governor Sir George Grey.

The tube or shell was briefly described by Dr. Gray in 1843, in the 'Fauna of New Zealand' appended to Dr. Dieffenbach's 'Travels in New Zealand.' As only the operculum was known at that time to Dr. Gray, and as that resembles very much in form the operculum of the molluscous genus of shells "*Vermetus*," he described it under the name of *Vermetus cariniferus*. A similar, and, I believe, the identical species has since that time been described and the animal figured by Schmarda, in his 'Neue wirbellose Thiere,' 1861, under the name of *Placostegus cæruleus*. My chief object in this brief notice is to give a few more particulars with regard to this species, to correct the synonymy, and to restore the specific name attached to it originally by Dr. Gray. I wish also particularly to bring before the notice of the Society the fact that the animal gives out a beautiful dye or colour. The specimens which were the subjects of my examination had been for a number of years in the British Museum, some having been placed there in 1845, and others in 1847. Notwithstanding their having been so long dry, when softened in water, taken out of the tubes, and placed in spirits of wine, they imparted to the liquid a beautiful and delicate red tint. The whole animal is of a fine blue colour, and the elegant tuft of branchial filaments intensely azure banded with white. In describing the tube of this species of Annelide in 1843, Dr. Gray had only one or two specimens to describe from, as the other specimens, which are now in the Collection of the British Museum, arrived long after that description was drawn up. He says, "the shell is thick, irregularly twisted, opaque white, with a high compressed wavy keel along the upper edge; mouth orbicular, with a tooth above it, formed by the keel. Operculum orbicular, horny." In the collection there are two or three specimens which occur single, and were found creeping on dead shells. To these this description applies very well; but, in addition to those, we have various specimens collected together into large masses nearly the size of a small human head, and consisting of several thousands of tubes twisted and twined together. In the generality of these we see the keel, mentioned by Dr. Gray as "high," "compressed," and forming "a tooth" at its extremity, becoming double as it were at a certain distance from the mouth of the tube, diverging a little from each other, the surface of the tube between the two keels being raised to the same height as the tube, and thus forming a rather broad flat tooth or strap which projects considerably beyond the circular rim of the mouth. In many specimens this tooth is sharp-pointed, but in others it is blunt and rounded at the point.

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* The genus *Placostegus* was constituted by Philippi to contain those species of *Serpula* which have a calcareous operculum (approaching very nearly in form to that of some of the Gasteropodous Mollusca) in the shape of a shallow disk, entire at the margin.

Schmarda asserts that the species described by him is also a native of the Cape of Good Hope. His description applies better to the New Zealand specimens than to those from the Cape, and I was led at first to separate the two as distinct species. A more careful examination, however, of all the specimens we possess from both these habitats, has now induced me to consider those from the Cape of Good Hope to be only a variety of the other. Several specimens of this variety, occurring in large masses of some thousands of tubes clustered together, were collected by Dr. Krauss many years ago at the Cape of Good Hope, and are now in the Collection of the British Museum.

This variety I have named

PLACOSTEGUS CARINIFERUS, var. *Kraussii*;

and I here append a more detailed description of it.

Char. Animal *Placostego carinifero* valde simile, sed minus intense cæruleum. Branchiæ pallide cæruleæ, albo-fasciatæ, filamentis circiter viginti et sex, uno latere plumosis. Setæ pedum longæ, numerosæ, simplices, ad finem curvatæ. Tubuli repentes, in massam magnam glomerati, dorso plane carinati, ligula plana, os supra extensa terminati.

Hab. Promontorio Bonæ Spei. (Mus. Brit.)

The animal differs from that of the specimens from New Zealand in being less deeply coloured, and perhaps being longer in proportion to the size of the tube. This is smaller, and the dorsal keel is perhaps rather flatter and less sharp-pointed at its extremity. The two sets of specimens, however, agree in this particular, that the animals, when softened in water and then immersed in spirits of wine, impart to the liquid the same beautiful red colour, though, as may be supposed from the animal being less deeply coloured, those from the Cape of Good Hope give out a slightly fainter hue.

3. PLACOSTEGUS LATILIGULATUS, *Baird.* (Pl. I. figs. 3, 3*a*, *b*.)

Char. Animal *Placostego carinifero* simile. Color corporis fuscus. Branchiæ albæ, cæruleo fasciatæ. Operculum calcareum, circulare, concavum, cæruleum. Tubuli repentes, flexuosi, dorso late carinati, carina in latam ligulam, supra os extensam desinens. Os interne cæruleum.

Hab. ——? (Mus. Brit.)

Only one mass, consisting of about 100 or more tubes, is in the possession of the Museum, and no history is attached to the specimen. The animal, softened in water and taken out of the tube, as far as can be ascertained from the imperfect state of the specimens, is very similar in appearance to the animal of the *Placostegus cariniferus*. It is about the same size as those taken from the var. *Kraussii*, from the Cape of Good Hope, but differs a good deal in colour. The body of the animal is of a fuscous-brown colour, the branchial filaments white, banded with blue, and the operculum is of an azure hue. The tubes are broad, clustered together, and creeping in a very flexuous manner; they are of a bluish colour, the mouth of the tube deeply so, and the flat dorsal keel is somewhat of the same hue. The tube itself and the keel which runs along the back are broad, the latter part especially so at its extremity, where it terminates in a flat, strap-like tooth or sort of hood which extends some way beyond the rounded mouth (fig. 3 *b*). The surface throughout is much wrinkled, and the whole tube presents an irregular form of growth.

We have no history attached to this specimen; and were it not that the animals in some of the tubes still exist, the mass might be taken for a group of fossil tubes.

4. PLACOSTEGUS GRAYI, *Baird.* (Pl. I. figs. 4, 4 *a*, *b*.)

Char. Animal, operculo excepto, ignotum. Operculum corneum ?, circulare, concavum. Tubuli flexuose repentes, depressi, valde rugosi, dorso late carinati, carina haud in ligulam os supra extensam desinens.

Hab. ——? (Mus. Brit.)

The only specimens we possess in the collection of the British Museum are a few tubes creeping on a stone. The operculum was found in two or three of the tubes, and, unlike the others belonging to the genus *Placostegus*, appears to be horny, of a circular form, and hollow or concave on its upper surface. The tubes are flexuose, very rugose, and possess, like the last-described species (*P. latiligulatus*), a rather broad flat keel along the back of the shell. This keel is very rugose or wrinkled, and does not extend beyond the mouth of the tube, which is quite circular (fig. 4 *b*). The form of the tube is very irregular, and in several specimens at the larger extremity it is cemented as it were by a smooth, hard calcareous secretion to the stone to which it is attached. The specimens were presented many years ago to the Museum by Dr. Gray, whose name I have attached to the species.

EXPLANATION OF PLATE I.

Fig. 1. *Heteronereis signata*, natural size; 1 *a*, one of anterior feet; 1 *b*, one of posterior feet; 1 *c*, seta of ditto; 1 *d*, head and 8 first segments of body: all magnified.

Fig. 2. *Eupomatus Boltoni*, natural size, on *Haliotis*; 2 *a*, operculum of ditto; 2 *b*, one of the spikes of ditto: both magnified.

Fig. 3. *Placostegus latiligulatus*, nat. size; 3 *a*, operculum of ditto: magnified; 3 *b*, extremity of tube, nat. size.

Fig. 4. *Placostegus Grayi*, nat. size; 4 *a*, operculum of ditto: magnified; 4 *b*, extremity of tube, nat. size.

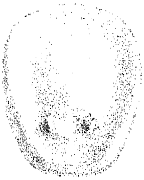
PART II.

(Plate II.)

[Read June 2, 1864.]

Genus CYMOSPIRA, *Savigny.*

Amongst the tubicolous Annelides belonging to the family Serpulidæ, the genus *Cymospira* of Savigny is remarkable. The branchiæ are described by Pallas and others as being very beautiful when seen in the living animal, and are rolled into spires of several turns. The operculum consists of a somewhat horny, elliptical, shallow plate, which supports two or more dentated horns or processes, generally near its hinder margin. The tubes of all the known species, of which only three or four have been described, burrow into or are attached to masses of Madrepore



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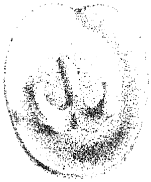

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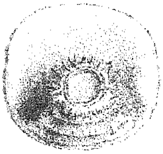

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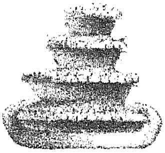

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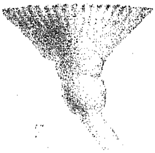

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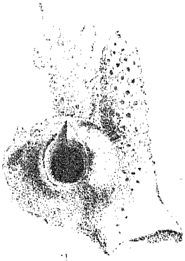

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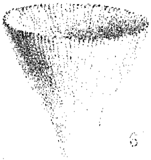

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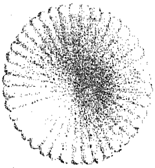

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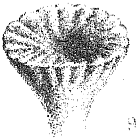

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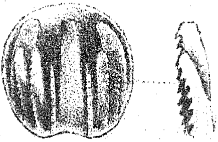

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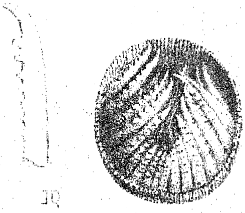

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Geo. West lith. ad nat.

W. West imp.

in the seas of the West Indies. In the collection of Annelides belonging to the British Museum we possess several additional species, found inhabiting coral in other parts of the world. One of these was found on a coral reef in the Arabian Gulf, and, in the structure of the operculum, &c., materially differs from all that have been previously described. The following is its description:—

5. CYMOSPIRA TRICORNIS, *Baird*. (Pl. II. fig. 1, operculum.)

Branchiæ in spiras quinque convolutæ. Operculum magnum, cornibus tribus dentatis armatum.

The branchiæ are disposed in five whorls. The filaments are densely plumose on one side and are of moderate length. The operculigerous filament is thick and fleshy. The operculum is large, nearly flat on the upper surface, and is armed with three stout, irregularly-toothed horns. The collar is large and fleshy. The spines of the thoracic segments are stout, rather short, and yellowish-coloured. The abdominal portion of the body is about 2 inches long, smooth on the ventral surface with the exception of a few longitudinal strong striæ, and strongly and densely striated across on the dorsal surface. The tube in which this annelide dwells is large, nearly as thick as a man's little finger, but so covered with coral deposit that it is very difficult to ascertain its form. We possess in the British Museum only two specimens of this animal, one of them being partly contained in a fragment of its tube. The mouth of this tube seems to be nearly round; but the rest of it is so covered with madrepore, in a mass of which it had apparently burrowed, that nothing more can be seen of its structure.

The whole animal is fully 3 inches long, tapered somewhat towards the tail, and about the centre of the body is nearly 4 lines in diameter.

Hab. Djedda, in coral reef. From the Collection of Mr. Metcalf. (Brit. Mus.)

6. CYMOSPIRA BRACHYCERA, *Baird*. (Pl. II. fig. 2, operculum.)

Branchiæ in spiras quinque convolutæ. Operculum magnum, cornibus duobus brevissimis irregulariter dentatis armatum.

Amongst the numerous objects of natural history collected during the surveying-voyage of H. M. S. 'Fly' by Mr. Jukes, Naturalist to the Expedition, and transmitted by him to the British Museum, are two specimens from Swain's Reefs, on the east coast of Australia, of the "animals of tubes that bore into coral." Neither the tubes themselves, nor fragments of the coral containing them, were secured; but as no doubt the former, like the other known species, would be completely immersed in and incrusted by the latter, little information could be obtained from them.

The branchiæ are coiled round in five spires. The filaments are of moderate length, and plumose on one side. The collar is rather thin and membranous. The operculigerous filament is thick and fleshy, and the operculum itself is large, of an oval form, and armed on its slightly concave surface with two very short and irregularly-toothed horns. The thoracic portion of the body is short and rather square-shaped, with a free margin on each side and on the lower edge; and the setæ of the feet are rather short and bright yellow. The abdominal portion is strongly and densely striated across. The entire length of the animal is about 3 inches (in spirits).

Hab. East coast of Australia. (Brit. Mus.)

The way in which these animals were seen and collected is thus described by Mr. Jukes in his Narrative of the voyage:—"A block of coral rock that was brought up by a fish-hook from the bottom at one of our anchorages was interesting from the vast variety and abundance of animal life there was about it. It was a mere worn, dead fragment; but its surface was covered with brown, crimson, and yellow nulliporæ, many small actiniæ and soft branching corallines, sheets of flustra and eschara, and delicate reteporæ, looking like beautiful lacework carved in ivory. There were several small sponges and alcyonia, sea-weeds of two or three species, two species of comatula and one of ophiura of the most delicate colours and markings, and many small, flat, round corals, something like nummulites in external appearance. On breaking into the block, boring shells of several species were found buried in it; *tubes formed by Annelida* pierced it in all directions, many still containing their inhabitants, while two or three worms, or nereis, lay twisted in and out among its hollows and recesses, in which, likewise, were three small species of crabs. This block was not above a foot in diameter, and was a perfect museum in itself, while its outside glared with beauty from the many brightly and variously coloured animals and plants. It was by no means a solitary instance; every block that could be procured from the bottom, in from 10 to 20 fathoms, was like it. What an inconceivable amount of animal life must be here scattered over the bottom of the sea, to say nothing of that moving through its waters, and this through spaces of hundreds of miles! Every corner and crevice, every point occupied by living beings, which, as they become more minute, increase in tenfold abundance." (p. 17.)

In the same collection of Annelides we possess specimens of a tube imbedded in madrepore collected by Mr. John MacGillivray from the coral reef of the island of Totoga, one of the Fiji group. From its appearance and habitat I consider it to belong to the same genus as the last, and propose naming it.

7. CYMOSPIRA MACGILLIVRAYI. (Pl. II. fig. 3, mouth of tube.)

Only the mouth of the tube is distinctly seen, the remainder being imbedded in and completely incrusted by the substance of the madrepore. The mouth of the tube is round, smooth internally but of a dark colour tinged with red, and at the upper edge is strongly marked with the projecting point of a keel, which most probably runs along the dorsal surface of the tube. This projecting point is somewhat tongue-shaped, of a smooth surface and a reddish colour, and reflected a little upwards and backwards.

It is to be regretted that the specimens we possess are so few in number, and the fragments of the madrepore which contain the tubes so small that it is impossible to ascertain the length of the tube. The circumference of the mouth of the largest specimen is fully $\frac{6}{8}$ths of an inch.

Hab. Coral reef of Totoga, Fiji Islands. (Brit. Mus.)

Genus POMATOSTEGUS, *Schmarda*.

When Philippi reconstructed the family Serpulidæ, taking the structure of the operculum as one of his chief generic characters, only two species of the genus *Cymospira* had then been described. One of these, the type of the genus, was the *Serpula gigantea* of Pallas, = the *Terebella bicornis* of Abildgaard, distinguished by its having an operculum consisting of an elliptical shallow plate armed with two ramified horns. The other was the *Terebella stellata* of Abildgaard, distinguished by the operculum being as it were multiplied, or raised up in three different floors or stories united to each other by a central column. Following up the subdivisions of Philippi founded on the operculum as a character, Schmarda has since founded a new genus for this latter annelide, which he has called *Pomatostegus*, and has described two new species from the coral reefs of Jamaica. The worm which I have now to describe belongs to this genus, but is a native of the seas of Australia. A single specimen was added to our collection about eight or nine months ago by Dr. Bowerbank, but no tube was collected, nor have we any further information about it.

8. POMATOSTEGUS BOWERBANKI, *Baird*. (Pl. II. figs. 4 & 5, operculum.)

Branchiæ curtæ, in spiram unam et dimidiam convolutæ. Opercula quatuor, versus apicem decrescentia, inarmata.

The branchiæ are rather short, the filaments plumose on one side only. Operculigerous lobe thick and fleshy. Operculum consisting of four stories united by a common central column, and densely covered with a rough coat of short hairs or filaments of a fibrous substance. These opercula diminish in size as they ascend, the last being very small and not armed with any spines or horns. Collar small. Thoracic portion of body short, square-shaped. Bristles of feet rather long and of a yellowish colour. Abdominal portion of body gradually tapering to the extremity, and striated across, the striæ wide apart. It is of a reddish-brown colour. The total length is 2½ inches.

Hab. Seas of Australia. (Brit. Mus.)

Genus SERPULA, *as restricted by Philippi.*

Taking the operculum as his principal character, Philippi restricts the old genus *Serpula* to those species which are distinguished by having the operculum of a horny substance, in the form of a rather shallow or funnel-shaped plate, the concave disk crenate on the margin, radiately grooved above, and supported on a subconical fleshy petiole. This organ is in many species of a beautiful shape, and, having in some instances a vitreous look, might, as Dr. Johnston well observes, "make an elegant pattern for a wineglass."

The species hitherto enumerated have been confined to the European fauna: I am not aware, at least, of any that have been described from any other part of the world; and Schmarda, who is amongst the latest authors that have paid attention to exotic Annelides, remarks that, however common they are in the Mediterranean, he has not found one exotic species. It is with much pleasure, therefore, that I dedicate the following, from Australia, to Mr. Jukes, to whom the British Museum is indebted for the specimen.

9. SERPULA JUKESII, *Baird*. (Pl. II. fig. 6, operculum.)

Branchiæ in spiram unam convolutæ, lacteæ, filamentis dorso canaliculatis. Operculum et filamentum operculigerum alba. Operculum profunde infundibulatum, multicrenatum. Tubus teres, solidus.

A single specimen of this species of the restricted genus *Serpula* was taken by Mr. Jukes, during the voyage of the 'Fly,' on the coast of Australia. The branchiæ are rolled up in a single spire, and are of a dull milk-white colour; the filaments are about thirty-four in number on each side, and on the dorsal surface are pretty deeply grooved or channelled. The operculum is deeply infundibuliform, of a white colour, the edge indented with numerous close-set crenations, the grooves extending down along the whole length of the outer surface. The body of the animal tapers towards the extremity, and is of a dull reddish colour and strongly striated across. The total length of the animal is about 1½ inch, the breadth about 1½ line. Only a fragment of the tube in which the worm lives was preserved. It is perfectly cylindrical, without any keel or striæ, is thick and solid, and of a white colour externally.

Hab. Seas of Australia. (Brit. Mus.)

10. SERPULA NARCONENSIS, *Baird.* (Pl. II. figs. 7 & 8, operculum.)

Branchiæ in spiram unam convolutæ. Operculum lacteum, minime profundum, dense crenatum; petiolum operculigerum gracile, prope finem nodosum.

This is a small species collected at Narcon Island during Captain Sir J. Ross's Antarctic exploring expedition; and only one specimen, without the tube, was procured. The chief character which marks the species is the form of the operculum. This is a white, rather shallow disk, elegantly formed, beautifully multicrenate on the margin, and radiately grooved on its upper surface internally as well as externally. The pedicle which supports it is slender, and terminates near the summit in a rounded knob, upon which the operculum is seated, being attached to it by a short stalk, which appears like a moveable joint. There is nothing particular in the form or characters of the body, except that it is short and stout, measuring in total length, including branchiæ and operculum, about 10 lines.

Hab. Narcon Island. (Brit. Mus.)

11. SERPULA ZELANDICA, *Baird.* (Pl. II. fig. 9, operculum.)

Animal, operculo excepto, ignotum. Operculum album, parvum, minime profundum, margine crenis viginti ornatum. Tubus gracilis, albus, repens, fere rotundus, carina longitudinali parva in dorso signatus; transversim flexuose striatus.

Several specimens of this small species of *Serpula* are in the collection of the Museum, the slender tubes creeping on fragments of old oyster-shells. The operculum is the only part of the animal preserved, as the specimens were transmitted in a dry state. Like that of the other known species of true *Serpula*, it is finely crenated on the margin. The crenæ are twenty in number, but the grooves externally are confined to the surface of the disk itself, and are not extended to the pedicel or stalk. The tube is slender, nearly round, with only a slight keel running longitudinally along its dorsal surface. It is white, the mouth is nearly circular, and the shell itself is strongly marked along its whole length with transverse flexuous striæ which encircle it.

The specimens in the collection are grouped together on the old oyster-shell, and mixed up with numerous specimens of zoophytes, Alcyonia &c. Most of them are more or less incrusted with these substances. Length of the tube about 16 lines; circumference about 1 line.

Hab. New Zealand. (Brit. Mus.)

EXPLANATION OF PLATE II.

Fig. 1. *Cymospira tricornis*, operculum.
2. *C. brachycera*, operculum.
3. *C. MacGillivrayi*, mouth of tube, in coral.
4, 5. *Pomatostegus Bowerbanki*, operculum.
6. *Serpula Jukesii*, operculum.
7, 8. *S. Narconensis*, operculum.
9. *S. Zelandica*, operculum.
10. *Eupomatus Boltoni*, operculum.
11. *Galeolaria decumbens*, operculum.

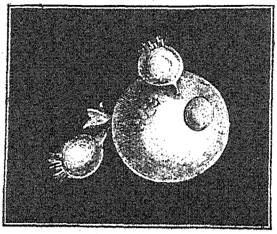
Note on *Cœnurus*. By T. Spencer Cobbold, M.D., F.R.S., F.L.S., Lecturer on Comparative Anatomy at the Middlesex Hospital.

[Read May 5, 1864.]

I beg to call the attention of the Society to a specimen of Cœnurus obtained from the viscera of an American Squirrel which died at the Zoological Gardens, Regent's Park, several years back. In doing so, my object is partly to correct the opinion, still very generally held, that there is only one kind of Cœnurus, and partly, also, to point out the time when the existence of a second kind of Cœnurus was first demonstrated, and by whom, likewise, the discovery was made. When, in January 1859, I described to the Society a large Cœnurus obtained from the viscera of a Madagascar Lemur, I carefully abstained from theorizing on the subject, but I never entertained any doubt as to its distinctness from the ordinary *Cœnurus cerebralis* of the Sheep. I refrained also from giving it any specific title, on the ground that it was only a larval parasite. Shortly afterwards, Leuckart, in one of his able 'Reports' in Wiegmann's Archiv (for 1860, S. 140), made special allusion to the description and figure as given in the Society's 'Transactions,' and at the same time referred to a case by Baillet who had recently discovered a Cœnurus in the pectoral muscle of a rabbit; he also quotes a similar example by Eichler, who had found a Cœnurus in the subdermal cellular tissue of a sheep. Until recently, I must confess that I was not aware that the discovery of a second kind of Cœnurus dated even much earlier than the period here mentioned, and I doubt if even Leuckart is yet aware of the earliest record on the subject. A few weeks ago, Mr. Caleb B. Rose, now of Great Yarmouth, but formerly of Swaffham, Norfolk, called my attention to the circumstance that he had described Cœnuri from the rabbit so far back as the year 1833. He had, indeed, mentioned the fact to me at the Cambridge meeting of the British Association, two years ago, but I could not, at that time, look fully into the matter. I further understood that Prof. Owen had doubted the correctness of Mr. Rose's interpretation of the facts observed. On comparing the facts as described in the original paper (published in the London Medical Gazette for November 9, 1833) with those observed by myself in the Cœnurus of the Lemur, and with those observable in the specimens now before the Society, I have no hesitation in saying that not only does a third kind of Cœnurus exist, but the priority of the discovery of the second kind of Cœnurus is due to Mr. Rose. How many kinds of Cœnuri may yet turn up, and how many specific tapeworm-forms they collectively represent, it is impossible to say; but my own examinations of, at least, three kinds of Cœnuri have led me to believe that they represent three separate species of *Tænia.* Proof on this score can only be obtained by future breeding-experiments. The study of Mr. Rose's paper further led me to look into Numan's elaborate Dutch memoir ("Over den Veelkop-blaasworm der Hersenen"), in which I find he has made frequent reference to Mr. Rose's paper, as well as to the earlier writings of Owen, Gulliver, Busk, Goodsir, and other English authors. As regards the Cœnurus in question, he merely gives the facts recorded by Mr. Rose; but he notifies the interesting circumstance that a veterinary surgeon of Burgau, Engelmeyer by name, has also found a

Cœnurus in the liver of a cat. Numan says *the* Cœnurus ("De Vee-arts wil *den Veelkop* gevonden hebben"), by which expression, as also by others elsewhere given, I conclude that the existence of a second, specifically distinct form of Cœnurus never once entered his mind. Be that as it may, he has done full justice to Mr. Rose and other English writers who have investigated the structure and economy of the hydatids and their allies.

From a microscopic examination of the specimens of the Cœnuri from the Squirrel, it would seem that these last undescribed polycephalous bladder-worms represent a kind of intermediate type between the ordinary brain-Cœnurus and Echinococcus properly so called. At all events, in place of separate heads (scoleces) in groups irregularly massed together as in *Cœnurus*, I find bundles of heads, so to speak, forming small nodules, which are often arranged in a linear manner. There is, on the other hand, no evidence of a true brood-capsule, such as we find in *Echinococcus*; but the formation of daughter vesicles, by the exogenous method of budding, reminds one of the ordinary mode of development seen in the hydatids derived from *Tænia echinococcus*. There are some other minute points, on which I am not at present prepared to dwell; these may reasonably stand over for future investigation. The little drawing, of which the woodcut is a copy, lent by Mr. Rose, and representing his Cœnurus (called *C. cuniculi* in his MS., but not so named in his published papers), is not unlike some of the Cœnuri from the American Squirrel, and it is not improbable that it may represent the larval condition of one and the same Tænia. What species of *Tænia* this may happen to be I do not care to conjecture, but I think it may be safely affirmed that it is not the *Tænia cœnurus* of authors.



A moderate-sized *Cœnurus cuniculi*, with daughter vesicles proliferating externally.—ROSE.

CORYNODINORUM RECENSIO. By the Rev. T. A. MARSHALL. Communicated by the Rev. HAMLET CLARK, F.L.S.

[Read April 21, 1864.]

THE following pages are the result of much investigation as to the published works of authors, and several weeks of careful examination as regards the material at my disposal. I propose in them to deal with a small subfamily of the Eumolpidæ, at once singularly beautiful in form, and singularly difficult from the similarity of their structure. The former consideration will explain why they were willingly selected as the subject of study, the latter why the results of that study have been so long delayed. The pleasure of the hours that I have spent in the work I owe to the kindness of my friend the Rev. Hamlet Clark, who not only placed at my entire disposal the whole of his rich collection, but has incessantly laboured, and not without success, to inspire me with a portion of his own ardour for the study of the Phytophaga.

Mr. Clark's collection comprises nearly every described form (so far as I have been enabled to discover them) of the present limited subfamily, and, besides these, a great number of novelties which it is the object of the following pages to describe. I ought to add that, in selecting this section of the Eumolpidæ (the genera *Corynodes*, *Chrysochus*, and their affinities) as the first subject for publication, I was much influenced by the kind suggestion of J. S. Baly, Esq., of Kentish Town, that I should turn my attention to these special forms. I willingly concurred in his views, and began at once to devote some leisure time to the subject which he had been good enough to mark out for me. I did so the more readily as that gentleman has himself published excellent papers on the Eumolpidæ, and common courtesy (which debars every student from intruding willingly upon the labours of others) demanded the selection of a group far removed from the present sphere of his occupation. Fortunately, or unfortunately (according to taste), the unoccupied ground is so extensive, that a dozen or more entomologists might well enter upon separate allotments, without much fear of committing a trespass upon their neighbours'.

On the CORYNODINA, *a Subfamily of the* EUMOLPIDÆ.

The two genera *Corynodes* and *Chrysochus*, as they now stand in collections, comprise one of the most strongly marked, as well as one of the most beautiful subfamilies of the Eumolpidæ. The characters presented by the large flattened club of the antennæ, the cylindrical thorax, and the vertical head, invisible from above, are such as immediately strike the eye; while the splendid hues which adorn the species, as well as the interesting considerations arising from their geographical distribution, cannot fail in a lively manner to impress the imagination.

The number of species is now considerable; and as they present several modifications of the typical form, which render their further subdivision necessary, it is intended in the following paper to propose a few sections, in which their mutual relations may be more adequately expressed. We shall also be enabled, through the kindness of the Rev. Hamlet Clark, to register for the first time many species hitherto unnamed, or only provisionally placed in collections under the MS. names of Dejean and others, as well as some of the nondescript rarities brought from the islands of the far East by Mr. Wallace.

A few words upon the literature of the group, comprising their history up to the present time, will not be considered out of place. One species only appears to have been known to Linné, *Chrysochares* (*Chrysochus*) *Asiaticus*, which was placed by him in the great genus *Chrysomela*. Fabricius first described some forms of the genus *Corynodes* or *Platycorynus*, arranging them in his earlier works under *Cryptocephalus*, and in the 'Systema Eleutheratorum' under *Eumolpus*. The seven Fabrician species are as follows:—

Eumolpus nitidus (Corynodes, *Hope*)	Siam; Malabar.
—— Asiaticus, *Linn.* (Chrysochares, *Moravitz*) .	S. Russia.
—— cyaneus (Corynodes)	W. Africa.
—— pretiosus (Chrysochus, *Redt.*)	Europe.
—— auratus (Chrysochus)	United States.
—— compressicornis (Corynodes)	S. Africa.
—— antennatus (Corynodes)	Java.

Olivier, in his 'Entomology,' redescribed the Fabrician species, mistaking however *cyaneus*, Fab., for a different insect, and added four others: *bifasciatus* (China), *cyanicollis* (Java), *Senegalensis* (W. Africa), and *Chrysis* (Bengal); but of these *Senegalensis* is doubtless only a variety of *compressicornis*, Fab. Chevrolat, in Dejean's Catalogue and in d'Orbigny's Dictionary, first separated from *Eumolpus* the two genera *Platycorynus* and *Chrysochus*, but left them both undescribed. The former has since been briefly characterized by Hope, Coleopt. Man. pt. 3. p. 162, and more completely by Gerstäcker in Peters's Reise nach Mossambique, p. 335, under the name *Corynodes*. *Chrysochus*[*], so far as it refers to the European species, has been pretty fully described by Moravitz, Horæ Soc. Ent. Rossicæ, t. i. 1861, p. 159, with the addition of *Chrysochares*, to contain *C. Asiaticus*, Linn., and also by Redtenbacher in the 'Fauna Austriaca.' Nine species of *Platycorynus* are mentioned in the 3rd edition of the Catalogue Dejean, of which four were at the date of its publication only MS. names. One of these, *P. Dejeanii*, has since found a describer in Gerstäcker, *l. c.* The same edition of the Catalogue contains three Fabrician species of *Chrysochus*—viz. *Asiaticus*, *pretiosus*, and *auratus*. A single additional description is to be gathered from Schönherr's Synon. Ins. i. 2. p. 235 note, *Corynodes Gröndalii*, Swartz, which is obviously a synonym of *bifasciatus*, Oliv. The above sketch comprises everything to be found in the older writers which conveys any certain information. More lately we have *Corynodes pyrophorus*, Parry (*Eumolpus*), described in the Ann. of Nat. Hist. 1844, vol. xiv. p. 454, and Trans. Ent. Soc. vol. iv. p. 86, which is identical with *C. gloriosus*, Baly, Ann. of Nat. Hist. 1859, vol. iv. p. 124. In Guérin-Méneville's Rev. Zool. 1841, p. 228, Chevrolat characterizes *C. indigaceus*, from Manilla. Mr. Baly has also described four other species of *Corynodes* (*decemnotatus*, *pulchellus*, *igneofasciatus*, and *pyrospilotus*) in the first vol. of the Journal of Entomology. In the Trans. Ent. Soc. vol. iv. p. 17, Mr. Hope gives a diagnosis of *Eumolpus ignicollis*, from China, afterwards described as *Chrysochus thoracicus*, together with *Chr. Chinensis*, by Mr. Baly, Ann. and Mag. N.H. 1859. We have also *Chr. cobaltinus*, Leconte, in vol. ix. of Reports of Surveys for a Railroad from the Mississippi to the Atlantic. T. W. Harris, in Massachusetts Reports, Insects, p. 108, has again characterized and figured *Chr. auratus*, Fab. Gebler, in the Bull. d. Moscou for 1860, No. 3. p. 36, gives us *Chr. punctatus*, from the vicinity of the Balkash Lake; and Motschulsky, Etudes Entom. ix. p. 23, has described a beautiful insect from Japan and China as *Chr. Gaschkevitchii*. Lastly, we are compelled to omit in this *résumé* four insects indicated by Hope, in Gray's Zool. Misc. i. p. 30, but too briefly to be identified. The genus *Callisina* of Baly is designedly passed over, as belonging, according to that gentleman's present views, to a different group.

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[*] Chrysochus, not Chrys*u*chus, as wrongly spelt in Schaum's Catalogue. The derivation (given by Chevrolat) is from *χρυσοχόος* or *χρυσοχοῦς*, 'a goldsmith,' and not *χρυσοῦχος*, 'having gold,' 'golden.'

With respect to the geographical distribution of the first group, *Corynodes*, it will be remarked that the great majority are Asiatic. The district within which they are found may be described as bounded by a line drawn from the Chinese Wall to the Indian Ocean, passing through the great Gobi, or desert of Tartary, and waving more or less till it emerges at some indefinite point on the western coast of Hindostan, at or near Bombay. In a S.E. direction the species may be traced to the Philippines and the larger islands of the Malay archipelago, Java, &c. as far as Borneo and

Celebes, beyond which the present state of our knowledge does not permit us to follow them. The few African species which have been brought to Europe inhabit the southern half of the African continent, from Senegambia on the west, to the territories of the Imam of Maskat on the east, opposite to Madagascar. *C. Dejeanii*, Gerst., has been brought by Peters from Mozambique. *Dejeanii*, Drège, in Dej. Cat. (another variety of *compressicornis*, Fab.), is common at the Cape and in Caffraria. A closely allied, but distinct, species of great beauty is from the inland lake Ngami. From the Gaboon River comes the largest and most splendid of the genus; and in the same part of the African continent occurs in profusion *compressicornis*, Fab., as well as one or two blue forms, which resemble somewhat those of India.

The African species present a constant variation in form from that which obtains among those of Asia; they have a much longer thorax, narrowed in front, and their elytra are more narrowly oblong.

It is to be regretted that the island of Madagascar has not been searched for these insects. The occurrence of the Asiatic forms there, with or without the African, may be regarded as possible, and their presence would throw some light upon the supposed early connexion of that island with Asia, in a physical as well as an ethnographical point of view,—a question of the highest interest, but at present involved in the most inscrutable mystery. It is at least certain that the botany and other natural productions of Madagascar present strong analogies to those of India and Malaysia, and recede in a proportionate degree from the African type, while the facies of the natives, and, above all, irrefragable linguistic proofs drawn from the Malagassee, point to a prehistoric connexion of the island with the eastern continent. The hypothesis of a voyage of Malay proas sufficiently explains one portion of the difficulty, but leaves the natural-history question still untouched.

The second group, consisting of *Chrysochus* and its affinities, is represented in Europe, Asia, and North America, but not, so far as we are aware, in Africa, nor in the southern regions of the New World. The Asiatic forms are by far the most numerous, occurring in almost every part of the continent, from the central plateau of Mongolia to the Malay peninsula, and from the Caucasus to Japan. The American species have hitherto been brought only from the northern temperate zone; they are represented (in the collections we have seen) by two or three forms from the Far West, Oregon, and California, and by an insect common in the

United States, *Eumolpus auratus* of Fabricius. It is singular that no species of the group has hitherto occurred in South America, where the luxuriance of vegetable growth is so favourable to the peculiar habits of the Phytophaga. *Eumolpus*, properly so called, appears in those regions as the analogue of *Chrysochus* and *Corynodes*.

Although it is easy to collect the scattered statistics of natural history, and to note the prevalence of certain forms of animal life in particular regions, we cannot but feel humiliated at the reflection how feeble is the grasp of our faculties, and how imperfect the inductions we can draw from the facts observed. Of the real laws which govern the dispersion of different creatures upon the face of the globe, and of the reasons (for there must be reasons) which have suggested the infinite variation of their organs, we are, and must probably for ever remain, in complete ignorance. We are forced, in order to satisfy our conceptions of the fitness of things, to the assumption that the bewildering maze of phenomena which we see is the result of the mere luxuriance of Power, and is infinitely varied only because the Power which creates is infinite.

We now proceed to deal with the first section of the subfamily before us, regretting that the materials at hand, although considerable, must inevitably fall short of representing every variety of form. The following is an attempt to draw up a synopsis of genera, in which the chief difficulty has been to obtain characters of sufficient prominence, in a family of acknowledged difficulty from the great similarity of their organs.

Tabula Generum Synoptica.

Fam. EUMOLPIDÆ.

Subfam. CORYNODINA.

Antennæ extrorsum plus minus incrassatæ s. dilatatæ, corpore breviores: thorax cylindricus lateribus marginatus, verticem supra occultans, plerumque post oculos utrinque sinuatus: corpus oblongum, convexum; pedes robusti, tibiis canaliculatis, extus apice angulatim productis; unguiculis bifidis s. appendiculatis.

† Antennæ distincte clavatæ; clavæ articulis, numero 5–7, compresso-dilatatis.

* Articulo ultimo apice late obtuso, rotundato . . . . . CORYNODES, *Hope*.

** Artic. ultimo apice acuminato . ACROTHINIUM.

†† Antennæ haud clavatæ, interdum leviter extus incrassatæ, articulis nec valde compressis, nec dilatatis.
  * Mandibulæ simplices . . . CHRYSOCHARES, *Moravitz.*
  ** Mandibulæ bidentatæ . . . CHRYSOCHUS, *Redt.*

Genus CORYNODES.

Hope, Col. Man. iii. 162. *Gerstäcker, Reise nach Mossambique,* p. 335. —Cryptocephalus et Eumolpus, *Fab. and others.*—Platycorynus, *Chevr., Baly.*

Caput verticale, thoraci profunde insertum, supra oculos profundius arcuatim impressum, desuper haud conspicuum. *Oculi* oblongi, intus leviter sinuati. *Antennæ* ad angulum oculorum infero-interiorem sitæ, corpore dimidio breviores, 12-articulatæ; articulus 1us subglobosus, 2us quintuplo minor, brevissimus; 3us oblongus, compressus, duobus præcedentibus longitudine æqualis; 4–6tum longitudine decrescentes, latitudine increscentes, compressi; 6tus subtriangularis; 7–10mum latissimi, valde compressi, cum 11mo et 12mo clavam 5–7-articulatam spatuliformem constituentes; 7–9num subtriangulares, latere externo emarginato, angulo interiore rotundato; 12mus 11mo fere absconditus §, arcte cum eo conjunctus, extus late rotundatus. *Labrum* oblongum, apice obtuse rotundatum, subito deflexum, utrinque hirtum. *Palpi maxillares* articulis ultimis duobus crassioribus, ultimo apice truncato. *Mandibulæ* obtuse bidentatæ. *Thorax* cylindricus, antice subito fornicatus, plus minus angustatus, genas arcte complectens, post oculos utrinque sinuatus, longior quam latior, lateribus subrectis. *Prosternum* antice subrectum, lateribus oblique deflexis; postice utrinque late sinuatum, lobo posteriore angusto. *Metasternum* angustum, antice 3-sinuatum angulis truncatis; lateribus subrectis, angulis posterioribus subacute productis. *Antepectoris processus antero-lateralis* scaleno-triangularis, apice ab humero suam ipsius longitudinem remoto. *Scutellum* parvum, semiellipticum. *Elytra* thorace latiora, oblonga, convexa, lateribus parallelis, lentius ad apicem conjunctim clausa, angulis anticis obtusis aut nullis. *Pedes* robusti, tibiis extus apice dilatatis, canaliculatis; tarsorum articulis subæqualibus; unguium appendiculis variis.

Type of the genus, *Corynodes compressicornis*, Fab.

I have some diffidence in proposing this genus in its present

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§ For the sake of convenience we shall for the future regard the antennæ as 11-jointed, reckoning the two last joints as one.

extent. I had originally intended to erect several of its sections into new genera, as well as to adopt Mr. Baly's *Platycorynus*. The only distinctions available for this method of division consist in the degree of dilatation of certain joints of the antennæ, and in the form of the appendiculæ of the claws, viz. whether they are free, and more or less acute (*bifidæ* of Lacordaire), or simply lobiform (*appendiculatæ* of Lacordaire). After mature consideration I am convinced that the attempt to establish genera upon these grounds alone would be highly artificial, and tend only to confusion by separating species otherwise closely allied. The characters are so vaguely expressed in some of the forms, that it might often be a question to which genus any given insect should be referred. The reader will therefore be spared the difficulty arising from this source. I have, however, characterized as subgenera some groups previously intended to form genera; such sections may be useful for the more ready determination of species, though they must be regarded as rather technical than natural.

Subg. i. (*Platycorynus*, Chevr., nec Baly). Unguiculæ bifidæ; antennarum clava 5-articulata; thorax longior quam latior, utrinque post oculos plane sinuatus; corpus elongato-oblongum, angustum. Species Africanæ.

1. C. COMPRESSICORNIS, *Fab.*

Fab. El. i. 419. 7. *Oliv.* 901, pl. 1. fig. 7.—Senegalensis, *Oliv.* 902, pl. 1. fig. 10.—Dejeanii, *Gerstäcker, Reise nach Mossambique*, p. 335. Cf. *Monatsber. der Berlin. Akad. d. Wissensch.* 1855.

The commonest of the African species, one or other of its varieties being found in every part of the continent, except the north. These varieties stand in collections under different names, according to their colours, but present no structural differences whatever.

Var. A. *Dejeanii*, Gerst. Major, læte purpureus, prothorace supra et capite igneo-cupreis, s. viridibus. Mozambique.

Var. B. *Senegalensis*, Oliv. Nigro-cyaneus, elytris æneis. Senegal.

Var. C. Totus igneo-purpureus, thorace et elytris concoloribus. Natal.

Var. D. Totus supra viridis, plus minus aureo micans. Natal.

Individuals are found of every intermediate shade of colour.

Note.—When the present descriptions were in an advanced state, a paper was unexpectedly sent to the author by J. S. Baly, Esq., issued, as he states, with the object of securing the priority to his nomenclature. It became necessary therefore either to suppress altogether the descriptions of the species handled by that gentleman, or else to retain them with the substitution of Mr. Baly's names for those originally proposed. The latter course has been adopted, after some deliberation. Mr. Baly's descriptions being limited to a Latin diagnosis, it is probable that the existence of a second and detailed description in a few cases will not be thought superfluous.

2. C. cyaneus, *Fab.*

Fab. El. i. 429. 4. *Guér. Icon. R. Anim.* vol. iii. p. 295. *Fab. Ent. Syst.* i. 324. 84, nec *Oliv.*—Platyc. laticornis, *Dej. Cat.*

C. elongato-ovatus, totus splendide nigro-cyaneus; thorace minutissime remote punctulato; elytris subtiliter irregulariter, humeros versus sub-bistriatim punctatis; segmentorum abdominalium marginibus cum metasterno interdum violaceo tinctis; tibiis, tarsis breviter fulvo hirsutis.

Long. $5\frac{1}{2}$–$6\frac{1}{2}$ lin.; lat. hum. 2–$2\frac{1}{2}$ lin.

Vertex gibbous, shining, more coarsely punctured than the thorax; vertical impressed line nearly, sometimes entirely, obsolete. Labrum and palpi with fulvous hairs. Eyes dark rufo-fuscous. Thorax very delicately punctulate (the punctules invisible to the naked eye), distinctly sinuated behind the eyes, antero-lateral angles subacute. Elytra irregularly punctulate, with traces of two punctured striæ descending from the humerus and obliterated posteriorly. Ungues rufo-piceous.

Hab. Senegambia.

The Fabrician diagnosis of this insect is as follows:—"Cyaneus, nitidus, pedibus nigris. *Hab.* in America meridionali. Mus. D. Banks."

The type specimens in the cabinet referred to are two in number; the first or left-hand-side one being *Chrysochus Chinensis*, Baly, the other *C. cyaneus*, Fab., distinctly labelled "in Africa æquin." The *Chrysochus* was probably the hasty addition of a later hand. The habitat given by Fabricius in his writings, and which differs from the ticket attached to the type, can only be an oversight, as no species of the present genus has ever been discovered in the New World. Olivier rectified, as he thought, the habitat, but mistook the insect altogether for an Indian species, which has done duty ever since in collections for the true *cyaneus*, Fab.

3. C. simillimus.

C. cyaneo affinis, subelongato-ovatus, violaceo-niger, nitidus; thorace subtilissime remote punctulato; elytris confertim irregulariter punctatis; subtus cum pedibus niger, minus nitidus.

Long. 5 lin.; lat. hum. $2\frac{1}{4}$ lin.

Closely allied to the preceding; differs in being more broadly ovate; thorax shorter in proportion, wider at the base, and less deeply sinuated behind the eyes; antero-lateral angles more obtuse. Elytra much more coarsely punctured, without traces of the faint humeral punctured striæ. The colour of the superior surface, especially the thorax, is violaceous black; the underside and legs black, much less shining.

Hab. Gold Coast.

A single specimen in the Rev. H. Clark's collection. It may prove to be only a variety of the preceding.

4. C. LAUTISSIMUS.

C. elongato-ovatus, thorace subtilissime punctulato, punctis paulo majoribus interspersis, metallico-cæruleus, splendidus, abdomine plus minus violaceo; elytris striato-punctatis, nitidissimis, aureo-viridibus; scutello cæruleo.

Long. 5½–6¾ lin.; lat. hum. 2–3 lin.

Elongate-ovate; front gibbous, with a faint vertical impression; eyes rufo-fuscous; head and thorax finely and irregularly punctured, with still finer and more numerous punctules between the punctures, dark shining blue, sometimes with a violaceous tinge; scutellum, and sometimes the suture, blue, the former punctulate. Elytra bright metallic green, with more or less of a golden tinge, densely punctate-striate, the punctures much coarser than those of the thorax; abdomen punctured, especially towards the apex; legs shining blue, thickly punctulate, apex of the tibiæ and the tarsi with fulvous hairs.

Brought by Deyrolle from the Gaboon River. Thomson's collection. Also in the British Museum.

One of the largest of the genus; very distinct from green examples of *C. compressicornis* by its superior size and brilliant polish.

5. C. PUSIO.

C. parvulus, elongatus, cupreo-purpureus, thorace supra, capite antice, scutello viridibus, nitidis; antennis nigris; thorace elongato, antice valde angustato, confertim punctato; elytris punctis majoribus densissime consitis; capite subexserto, vertice desuper conspicuo.

Long. 3¾ lin.; lat. hum. 1¼ lin.

Thorax at the base more than twice as broad as in front; the sides subparallel from the base to rather more than one-half their length, then obliquely rounded to the front; head subexserted, eyes projecting at each side beyond the thorax; vertex gibbous, visible from above. Antennæ dull black. Labrum, palpi, and mandibles piceous. Front, vertex, and disk of the thorax metallic green, very thickly punctured, almost rugose; scutellum golden green, brilliant, nearly impunctate. The rest of the insect cupreous, with a purple or violaceous tinge, except the tibiæ and tarsi, which are blackish.

Hab. Shores of Lake Ngami.

The smallest of the African species, and distinguished from all others by its prominent head and by the shape of the thorax. It is probably the type of a subsection peculiar to the interior of Africa.

A single specimen in the Rev. H. Clark's collection.

Subg. ii. (*Corynodes*, Hope, Baly). Unguiculæ bifidæ; antennarum clava 6-articulata. Thorax brevior, plerumque transversus, antice minus angustatus, post oculos vix aut ne vix quidem sinuatus. Corpus crassius, magis convexum; elytris sæpe versicoloribus, maculis, fasciis, præclare distinctis, quum eadem in subgenere primo semper unicolora reperiantur. Species ab Africa exsulant.

6. C. BIFASCIATUS, *Oliv.*

Oliv. 900, pl. 1. fig. 5.—undatus, *Oliv. Encycl. Méth.* vi. 614. 31.—Gröndalii, *Swartz, Schönh. Syn. Ins.* i. 2. p. 235, note.
Hab. China.

Common in collections.

7. C. ANTENNATUS, *Fab.*

Fab. El. i. 419. 8.—*Oliv.* 900, pl. 1. fig. 6.
Hab. Java.

Easily recognized by its black colour. Common in collections.

8. C. PEREGRINUS, *Füessly.*

Füessly, Archiv Ins. iv. p. 63. no. 16, tab. 23. fig. 25 (Cryptocephalus).—cyaneus, *Oliv.* 899, pl. 1. fig. 4 *a*, *b*, nec *Fab.*
Hab. India.

A very abundant species, varying much in size, but easily recognized by the coarse irregular punctuation of the thorax. It stands in collections as *cyaneus*, Fab., Oliv., which however are two different insects (see Sp. 2, remarks). In any case, Füessly's name *peregrinus* must be restored, in obedience to the law of priority.

9. C. CYANICOLLIS, *Oliv.*

Oliv. 902, pl. 1. fig. 9.
Hab. Java.

A single specimen in the Rev. H. Clark's collection.

10. C. PYROPHORUS, *Parry.*

Parry, Ann. N. H. vol. xiv. 1844, p. 454, and *Trans. Ent. Soc.* vol. iv. p. 86.—gloriosus, *Baly, Ann. N. H.* vol. iv. 1859, p. 125.
Hab. Assam.

In the collections of the Rev. H. Clark and Mr. Baly; also in the British Museum.

11. C. INDIGACEUS, *Chevr.*

Chevr., *Guér.-Mén. Rev. Zool.* 1841, p. 228.—Hopei, *Baly*, *Descriptions of new gen. and sp. of Phytophaga*, April 19, 1864, p. 7.

Hab. Philippine Islands.

In the collections of the Rev. H. Clark and Mr. Baly.

12. C. IANTHINUS.

C. oblongus, ovatus, depressus, elytris latis; totus cyaneus, fronte, thorace, humeris, corpore subtus purpureo tinctis; thorace irregulariter, elytris subtilius substriatim punctatis.

Long. 4½ lin.; lat. hum. 2 lin.

Front transversely rugose, with irregular punctures, the longitudinal furrow wanting. Thorax much narrower than the elytra, subglobose above, irregularly punctured, the punctures larger and more remote at the base and on the middle of the disk. Fifth and sixth joints of the antennæ dilated; the remaining joints very broadly dilated. Elytra wide, not very convex, depressed, parallel to about ⅚ths of their length, then obtusely rounded; cyaneous, with purple reflexions, especially on the shoulders and sides; very finely punctulate, the punctures not forming distinct striæ. Underside and legs concolorous.

Hab. ——?

A single specimen in the Rev. H. Clark's collection, derived from that of Chevrolat.

Subg. iii. (*Theumorus*, nobis). *Caput* declive, cum oculis exsertum; his breviter ovatis, prominulis, intus vix sinuatis; *antennæ* prælongæ, articulis 7 ultimis compresso-dilatatis: articulo 1^{mo} subgloboso; 2^{do} minore, extus prominulo; 3^{tio} elongato, cylindrico; 4^{to} ad ultimum latitudine increscentibus, compresso-dilatatis; 5^{to} ad 9^{num} extus basi subito rotundatis, et cum articulorum sequentium angulis speciem serriformem præbentibus; articulo ultimo ovato. *Thorax* longior quam latior, supra globosus, medio gibbosus, basi et antice angustior, lateribus rotundatis; angulis anticis intro convergentibus, collum arcte stringentibus. *Antepectoris processus anterolateralis* elongato-triquetrus, thoracis angulum fere attingens. *Scutellum* orbiculare. *Elytra* thorace latiora, modice convexa, disco antice subdepressa, parallela, thorace triplo longiora. *Pedes* validi, tibiis anticis elongatis, incurvatis: ungues appendiculis acutis, unguiformibus, a basi usque liberis.

13. C. AMETHYSTINUS.

C. supra saturate violaceus, splendidus; subtus cum antennis pedi-

busque niger; thorace fortissime irregulariter, elytris modice vix striatim punctatis; vertice impresso, fronte rugosa.

Long. 4 lin.; lat. hum. $1\frac{2}{3}$ lin.

Head coarsely and thickly punctured, irregularly impressed between the eyes, below which impression the surface becomes transversely rugose. Vertex with an ovate impression. Thorax and elytra very shining, the former coarsely punctured, the punctures less distinct towards the antero-lateral margins: the elytra less coarsely punctured, the punctures equidistant, and therefore forming only obscure striæ, except near the suture, where a single stria is isolated. Anterior tibiæ elongate, curved downwards and inwards. Antennæ and tarsi very robust.

Hab. not indicated.

In the Rev. H. Clark's collection.

Subg. iv. (*Eurycorynus*, nobis: *Platycorynus*, Baly). Antennarum clava 5-articulata. Tibiæ intermediæ in ♂ plerumque extus ante apicem sinuatæ. Unguiculæ appendiculatæ s. dentatæ. "Very closely allied to *Corynodes*, Hope" (Subg. ii.), "but separated by the appendiculated claws and 5-jointed club of the antennæ." *Baly.*

14. C. CHRYSIS, *Oliv.*

Oliv. 901, pl. 1. fig. 8.

Hab. India, Bengal.

The typical colour is bright metallic green. For the following description of a fine variety (at first supposed by me to be distinct) I am indebted to the kindness of the Rev. H. Clark.

C. subelongatus, metallico-aureus, ad latera sensim purpureus, juxta suturam et ad humeros viridi-aureus; capite punctato, ad medium longitudinaliter depresso, nigro-cyaneo; thorace sparsim irregulariter punctato; elytris crebre fortiter punctato-striatis; corpore subtus pedibusque fusco-æneis.

Long. $4\frac{1}{2}$ lin.; lat. hum. 2 lin.

Of a brilliant metallic gold colour, the sides tinged with purple, and the upper part with greenish gold; in form parallel and sufficiently elongate. Head thickly punctate, purplish copper-coloured, with a medial longitudinal dark-blue depression. Thorax subcylindrical, short, sparingly and very irregularly punctate. Scutellum deep purple, impunctate. Elytra subparallel, with prominent shoulders; their surface thickly punctate-striate (the punctures coarse and irregular, so that the striations are somewhat indefinite). Legs and underside dark greenish, metallic. The antennæ in the specimen described are unfortunately absent.

In the Rev. H. Clark's collection.

15. C. NITIDUS, *Fab.*

Fab. Ent. Syst. i. 325. 86; *El.* i. 418. 2. *Oliv.* 903, pl. 1. fig. 11. *Erichs. Schomb. Reise*, Th. iii. p. 577.—Platyc. Sheppardi, *Baly*, *Descriptions of new gen. and sp. of Phytophaga*, April 19, 1864, p. 7.
Hab. Southern India.

I have verified this insect from the original type in the Banksian collection. It has much of the facies of the genus *Trichochrysea* of Baly, or of the larger undescribed forms of *Bromius*. In Dejean's Catalogue it is placed doubtfully as a true *Eumolpus*.

Frequent in collections.

16. C. 10-NOTATUS, *Baly.*

Baly, Journ. Ent. vol. i. 1860, p. 31.
Hab. India, Vizapore.

In the collections of the Rev. H. Clark, Mr. Baly, and the British Museum.

17. C. PULCHELLUS, *Baly.*

Baly, Journ. Ent. vol. i. 1860, p. 31.
Hab. Siam.

In the collections of Messrs. Clark and Baly.

18. C. IGNEOFASCIATUS, *Baly.*

Baly, Journ. Ent. vol. i. 1860, p. 32.
Hab. Siam.

19. C. PYROSPILOTUS, *Baly.*

Baly, Journ. Ent. vol. i. 1860, p. 32.
Hab. Siam.
Var. A. Thorax maculis aureis obsoletis.

In the Rev. H. Clark's collection.

20. C. FLOSCULUS.

C. oblongo-elongatus, valde convexus, purpureo-cæruleus, metallicus; thorace sparsim punctato; elytris punctato-striatis, singulis macula parva laterali sub humero aurea, fasciis duabus latis, linea suturali connexis, splendide viridi-aureis.

Long. $4\frac{3}{4}$ lin.; lat. hum. 2 lin.

Facies and punctuation of *C. pulchellus*, Baly, but the thorax is less transverse and the colours different. Of a rich metallic purple or violaceous blue. Elytra with two small aureous spots placed one on each side below the humeral callus. Two large rounded patches occupy the base, filling up the sutural angle and extending nearly to the exterior margin, connected along the suture with a broad transverse fascia just behind the middle, which touches the suture and all but reaches the exterior margin, its anterior edge nearly straight, the hinder obliquely sloping, so that the lateral edge of the fascia is twice as broad as the sutural. These spots and fasciæ bright golden, metallic; green when viewed obliquely. Punctate striæ obsolete behind.

Brought from Camboja by M. Mouhot.

A single specimen in the Rev. H. Clark's collection.

21. C. COSTATUS, *Baly.*

Baly, Descriptions &c. p. 2.—*Hab.* Manilla.

22. C. MARSHALLI, *Baly.*

Baly, ibid.—*Hab.* Gilolo.

23. C. LONGICORNIS, *Baly.*

Baly, ibid.—*Hab.* Manilla.

24. C. CUMINGII, *Baly.*

Baly, ibid. p. 3.—*Hab.* Manilla.

25. C. ROBUSTUS, *Baly.*

Baly, ibid.—*Hab.* Sumatra.

26. C. CONGENER, *Baly.*

Baly, ibid.

C. oblongo-ovatus, crassiusculus, valde convexus, nitidus, totus saturate violaceo-cæruleus; elytris subseriatim, capite et thorace irregulariter punctatis s. punctulatis; subtus tenuiter fulvo-villosus; antennis (modice tantum dilatatis) et tarsis nigris.

Long. 5 lin.; lat. hum. $2\frac{1}{2}$ lin.

Head, thorax, and elytra very finely punctured; impressed line of the vertex nearly obsolete; eyes reddish. Punctures of the elytra more distinct at the lateral margins, less visible at the apex, arranged in somewhat irregular lines upon the disk. Thorax longer than broad, one-half wider at the base than in front: anterior angles distinctly produced; moderately sinuated behind the eyes. Elytra about one-fourth wider than the thorax, twice as long as their width, not attenuated posteriorly until just before the apex, very convex, suddenly deflexed behind. The humeral callus impunctate, within which is the usual linear impression; and on the disk of the elytra, much before the middle, a slightly curved transverse impression extending from the suture nearly to the deflexed margin. Abdomen and lateral edges of the elytra violaceous; legs with violet and green reflexions.

Hab. Manilla; Java.

From Reiche's collection.

I have before me a specimen with the thorax much more coarsely punctured and somewhat less elongate; but as it differs in no other respect from the individuals described, I cannot but regard them as belonging to the same species. Similar and even greater discrepancies are to be observed in the common *C. peregrinus*, Füessly.

27. C. MUTABILIS, *Baly.*

Baly, ibid.—*Hab.* Menado, Sumatra, Ceram.

28. C. FABRICII, *Baly.*

Baly, ibid. p. 4.—*Hab.* Sumatra.

29. C. BISERIATUS, *Baly.*

Baly, ibid.—*Hab.* Macassar.

30. C. WATERHOUSII, *Baly.*

Baly, ibid.—*Hab.* Manilla.

31. C. DOHRNII, *Baly.*

Baly, ibid.

C. elongato-oblongus, modice convexus, humeris latis, subrectangulis, supra splendide cyaneus, fronte viridi, thorace, humeris, elytrorum lateribus violaceo tinctis; subtus cum pedibus cæruleo-viridis; antennis fulvis, clava nigra.

Long. 6¼ lin.; lat. hum. 3 lin.

Vertex gibbous, thickly punctured, violaceous blue, with a fine central impressed green line. Labrum, palpi, and antennæ fulvous, except the five dilated joints of the last, which are black. Front dull green, rugosely punctate, with a small lamina on each side, next the eyes, bright green, impunctate. The face and ocular orbits beset with testaceous hairs. Thorax very shining, finely and remotely punctured, sinuated on each side behind the eyes, cyaneous, with a purple gloss. Elytra long, the shoulders broad and rectangular, finely punctate-striate, the striæ invisible before the apex; bright cyaneous, with a purple reflexion on the shoulders and sides. Beneath dull bluish green; hairs of the tibiæ and the pulvilli fulvous.

Hab. Ceylon.

The finer punctuation of the thorax and elytra, the rectangular humeri, and the characters of the face above mentioned, render this species abundantly distinct from *peregrinus*, Füess., the only described species with which it can be confounded. Mr. Baly's type is described as being "viridi-æneus." The above is evidently a blue variety of the same insect.

32. C. ÆNEUS, *Baly.*

Baly, ibid. p. 5.—*Hab.* Sarawak, Borneo.

33. C. STEVENSI, *Baly*.

Baly, ibid.—*Hab.* Tondano; Menado.

34. C. ELEGANTULUS, *Baly*.

Baly, ibid.—*Hab.* Celebes.

35. C. FRATERNUS, *Baly*.

Baly, ibid.

C. ovatus, valde convexus, totus læte viridis, metallicus; thorace transverso, subtiliter punctato, basi lata, lateribus subdilatatis, rotundatis, post oculos utrinque leviter sinuato; elytris striato-punctatis, lateribus et apice costatis.

Long. 3 lin.; lat. hum. 1½ lin.

Vertex distinctly punctured, with a longitudinal furrow; face beset with fulvous hairs; orbital spaces blue. Thorax depressed at the base, nearly as broad as the elytra, compressed and very convex in front, remotely punctate, the punctures more distant and somewhat larger towards the base; sinuated behind the eyes. Elytra very convex, punctate-striate, the punctures larger and somewhat confused towards the shoulders and in the antemedial transverse impressions. The exterior half of each elytron costate, the costæ increasing in elevation towards the lateral margin and apex. Body and legs entirely metallic green, with a bluish reflexion when viewed obliquely.

Hab. Sumatra.

The specimens received from Reiche by the Rev. H. Clark are ticketed as Javan.

36. C. FULGURANS.

C. viridi-æneus; capite longitudinaliter impresso; thorace leviter punctato; elytris post humeros transverse depressis, leviter punctatis; corpore subtus pedibusque nigro-æneis; antennis rufo-fuscis.

Long. 4–4½ lin.; lat. hum. 1¾–2 lin.

Entirely of a bright metallic green colour; head finely punctate, with a faint medial longitudinal depression, which is obsolete near the base. Thorax constricted in front, sparingly punctate. Scutellum impunctate. Elytra with an intermediate transverse depression on either side behind the shoulders; the surface finely punctate-striate (the punctures coarser near the margins). Underside and legs dark bluish green; apical segment of the abdomen and the pulvilli flavo-pubescent. Antennæ rufo-fuscous, the five apical joints largely dilated.

Hab. Ceram; taken by Mr. Wallace.

37. C. PERPLEXUS, *Baly*.

Baly, ibid.—*Hab.* Singapore.

38. C. CUPREUS, *Baly*.

Baly, ibid. p. 6.—*Hab.* Malay peninsula.

39. C. CŒLESTINUS, *Baly*.

Baly, ibid.—*Hab.* Malay peninsula.

40. C. FUSCO-ÆNEUS, *Baly*.

Baly, ibid.—*Hab.* Singapore.

41. C. APPROXIMANS, *Baly*.

Baly, ibid.—*Hab.* Sumatra.

42. C. IGNITUS, *Baly*.

Baly, ibid.—*Hab.* Pulo Penang.

43. C. MOUHOTI, *Baly*.

Baly, ibid. p. 7.—*Hab.* Camboja.

44. C. PARVULUS, *Baly*.

Baly, ibid.—*Hab.* Singapore.

45. C. GRATIOSUS, *Baly*.

Baly, ibid.

C. cyaneo-viridis, punctatus, nitidus; capite thorace cyaneis, hoc sparsim, illo crebre punctato; scutello antice medio depresso; elytris viridi- vel nigro-cyaneis, ad latera cyaneis.

Long. 5–6 lin.; lat. hum. 2–2½ lin.

Bluish green, brilliant, impubescent, punctate. Head bright blue, thickly and minutely punctate. Thorax sufficiently angustate in front, the sides narrowly margined (the margination being invisible when the insect is viewed from above); surface finely and sparingly punctate, of a bright blue colour. Scutellum subcordiform, medially depressed in front, impunctate, greenish blue. Elytra robust, coarsely punctate, dark bluish green; the sides more distinctly blue. Underside and legs dark greenish blue. Antennæ robust, fuscous, the five terminal joints broadly dilated.

Hab. Rangoon.

Received from Rangoon by Mr. Stevens; and in the collections of the Rev. H. Clark, Mr. Baly, and the British Museum.

46. C. AMPULLATUS.

C. cyaneus, nitidus; capite punctato, inter oculos transverse depresso; thorace inæqualiter punctato; elytris subtiliter punctato-striatis; corpore subtus pedibusque nigro-cyaneis.

Long. 5 lin.; lat. hum. 2½ lin.

Entirely violaceous blue; head coarsely and thickly punctate, with an irregular transverse depression between the eyes. Thorax somewhat shorter than in *gratiosus*, sparingly and irregularly punctate. Scutellum fuscous, impunctate. Elytra large and broad, finely punctate-striate (the punctures smaller and more regular than in *gratiosus*).

Abdomen towards the apex slightly fusco-pubescent. Legs darkly azure-blue, the femora punctate, the tarsi on the under side thickly clothed with pale fulvous pubescence. Antennæ short, the apical joints considerably widened.

Hab. Java.

This species must be carefully distinguished from the preceding, and also from *cyaneus*, Fab. From the latter it may be known by the form of the thorax, which is much shorter, broader at the base, and more angustate in front, and by the much finer punctuation of the superior surface, which gives it a more glabrous appearance.

47. C. MALACHITICUS.

C. nigro-viridis, punctatus; capite impunctato, longitudinaliter foveolato; thorace sparsim punctato; elytris post humeros transverse depressis, tenuiter punctatis; pedibus nigro-viridibus, tarsis flavo-pubescentibus; antennis rufo-fuscis, in ♂ prælongis.

Long. 5 lin.; lat. hum. 2 lin.

Entirely of a dark bluish green colour. The antennæ very long. Head of a dark-blue colour, impunctate, with a faint medial longitudinal impression. Thorax angustate in front, very finely and sparingly punctate. Scutellum impunctate. Elytra robust, with a transverse depression on either side behind the shoulders; the surface is finely punctate-striate. Abdomen and underside dark bluish green; the apical segments, and also (more fully) the tarsi, clothed with fusco-flavous pubescence. Antennæ rufo-fuscous; the five apical joints broadly dilated.

Hab. India.

48. C. HYACINTHINUS.

C. congeneri proxime affinis, minor; saturate cæruleus; thorace nitidissimo, subtilissime punctulato, lateribus rotundato; subtus cum facie cæruleo-viridis, antennis (articulo primo excepto) tarsisque nigris.

Long. 4 lin.; lat. hum. $1\frac{3}{4}$ lin.

Very similar to *C. congener*, but smaller, without any violaceous reflexion, deep shining blue. Thorax very finely punctulate, the punctures invisible to the naked eye. Labrum, first joint of the antennæ, pectus, and abdomen bluish green, the last finely villose with pale hairs. Sides of the thorax distinctly rounded.

From Java; Reiche's collection.

49. C. SUAVEOLUS.

C. congeneri affinis, quintuplo minor; supra saturate violaceo-cæruleus, nitidus; thorace elytrisque sat fortiter, his striatim punctatis; subtus cum elytrorum limbo violaceus, antennis tarsisque nigris.

Long. 3 lin.; lat. hum. $1\frac{1}{2}$ lin.

Front violaceous, with a green shining spot on the inner side of each eye; vertex with an impressed line and coarse scattered punctures; labrum violaceous, rugose; mandibles black. Thorax, viewed from above, semielliptical, the sides rounded; coarsely punctured. Elytra punctate-striate, with purple reflexions. Body beneath entirely purple or violaceous. Joints of the antennæ broadly dilated.

From Manilla; Reiche's collection.

50. C. ASPHODELUS.

C. suaveolo affinis; supra saturate cæruleus, violaceo et viridi variatus, scutello viridi, humeris elytrorum limbo indeterminate purpureis; subtus cæruleo-viridis, capite thorace subtiliter punctulatis; elytris striato-punctulatis, post humeros profunde transversim impressis, impressionibus fortiter punctatis.

Long. 3 lin.; lat. hum. 1½ lin.

Size and form of the preceding; differs in the much finer punctuation of the head and thorax and in the colour. Front violaceous blue, with a large triangular elongate impression; the depressed space between the eyes and the vertex on each side green. Elytra moderately punctate-striate; the punctures much larger and deeper in the transverse discal impressions. The superior surface is dark blue, stained with ill-defined patches of green and purple; the margins of the elytra indeterminately purple. Beneath dull bluish green, the sterna and legs violaceous.

From Nepal; Reiche's collection.

51. C. SPECULUM.

C. ovatus, valde convexus, crassior, metallico-viridis, splendidus; elytris disco aureis; abdomine subtus, parapleuris femoribusque purpureis; scutello cæruleo-viridi; thorace antice fortiter crebre punctato, basin versus impunctato; elytris striato-punctulatis.

Long. 5 lin.; lat. hum. 3 lin.

Front thickly punctured, the punctures smaller than those of the thorax. Thorax short, only slightly narrowed in front, hardly sinuated behind the eyes, its breadth at the base about equal to its length; very coarsely punctured anteriorly and on the disk (like the thorax of *C. peregrinus*, Füessly), smooth and impunctate towards the base. Elytra short, very convex, much deflexed behind, with a wide, shallow circular impression on each side within the humeral callus, and a slight lateral transverse depression before the middle. Punctured striæ fine and regular, continued to the apex. Upper surface very brilliant, green if viewed obliquely, otherwise golden; the thorax is of a more bluish green.

Hab. Java.

A single specimen from Chevrolat's collection.

52. C. CHALYBEUS.

C. oblongo-ovatus, parum convexus; thorace basi lato, medio latiore, lateribus rotundatis, antice angustato; cæruleo-viridis, supra saturate chalybeus s. cyaneus; thorace parce omnium subtilissime punctulato, elytris substriatim punctatis.

Long. 4½–2⅔ lin.; lat. hum. 1¾–1 lin.

Front finely punctulate, subcanaliculate; clypeus ovate, distinctly margined, separated from the epistoma by a curved line: ocular fovea shallow. Thorax smooth, shining, bright steel-blue, very finely and sparsely punctulate, wide at the base, still wider and rounded at the sides, subdepressed above, narrowed and compressed anteriorly, not sinuated behind the eyes. Elytra concolorous with the thorax, irregularly and finely punctate-striate, the punctures coarser at the sides and towards the shoulders; these last prominent, obtusely angular. Within the humeral callus is a deep, longitudinal, punctured fovea, and between this and the suture a large, round, smooth, elevated space. Underside and legs bluish green, metallic, with pale pubescence. Antennæ with the basal joints more or less fulvous, the club cyaneous.

Brought from Camboja, and the Shan country, in the Birman Peninsula, by M. Mouhot. It varies considerably in size.

Subg. v. (*Omodon*, nobis: *Platycorynus*, Baly.) *Antennæ* articulo 1° globoso, magno; 2do globoso, triplo minore; 3tio et 4to æqualibus, elongatis; 5to et 6to vix leviter compressis, paulum dilatatis, elongatis; 7mo ad ultimum fortius compresso-dilatatis, ultimo ovato. *Palpi maxillares* articulo penultimo subgloboso, ultimo obtuse conico. *Thorax* transversus, basi latus, antice parum angustatus, utrinque post oculos vix sinuatus, lateribus rotundatis. *Antepectoris processus* brevis, isoscelitriangularis, apice a thoracis angulo longe remoto. *Scutellum* semiellipticum. *Elytra* thorace paulo latiora, inter humeros minus convexa, postice sensim attenuata, valde convexa; post humeros profunde transversim impressa, rugosa, tuberculis 4 vel 5 plus minus acutis munita. *Pedes* breves, robusti, tibiis extus latius canaliculatis; ungues appendiculis vix apice liberis. ♀. Antennæ ♂ prælongæ, corporis ultra secundum quadrantem extensæ.

53. C. TUBERCULATUS, *Baly.*

Baly, Descriptions &c. p. 3.

C. oblongo-ovatus, subtus cum capite thorace et pedibus cæruleo-viridis, metallicus; elytris cæruleis, prope humeros et scutellum subviridibus; subtiliter punctatus; antennis nigris, articulis 7 basalibus subcæruleis. ♀.

Long. 4–4½ lin.; lat. hum. 1¾–2 lin.

Vertex with a linear impression, thickly punctulate; face between the eyes bright metallic green. Thorax finely punctulate, the punctures much smaller than those of the elytra. Elytra moderately punctured, more coarsely towards the shoulders and sides; the punctures only partially arranged in striæ. Lateral tubercles of the elytra arranged in three interrupted costate lines commencing at the humerus; the inner series double at the base, obsolete before the middle of the elytron; the second series extending in a costa beyond the middle; both these series are interrupted by a broad transverse impression, abbreviated on both sides: third series not interrupted by the transverse impression, prolonged in a smooth costa to the apex. Underside and legs with fulvous pubescence.

Var. With the thorax dark blue, underside and legs dull purple; the lateral costæ and tubercles much less developed.

The elongate antennæ of the ♂ and (in the specimen examined) the different colour of the upper surface, with the absence of tubercles, caused me at first to regard it as a different species. I am ignorant whether examples of the female occur of a bright copper colour. The following is a description of the male in the Rev. H. Clark's collection:—

C. oblongo-ovatus, convexus, confertim subtiliter punctulatus, vertice sulcato; supra læte purpureo-cupreus; oculorum orbitis, scutello, thoracis elytrorum marginibus, sutura tenuiter, viridi-cæruleis; corpore subtus et pedibus cyaneis, fulvo-hirtis; antennis tarsis nigris. ♂.

Long. $3\frac{1}{4}$ lin.; lat. hum. $1\frac{3}{4}$ lin.

Regularly oblong-ovate, moderately convex, finely and densely punctured—the vertex especially, where the punctures are oblong and confused. Labrum and vertex of a bright purplish copper-colour, the latter furrowed longitudinally; the orbital region blue; mandibles and antennæ black. Thorax seen from above semielliptical, truncate at the base, and rounded in front, where it is only one-third as broad as at the base; its anterior angles less than right angles, not produced; faintly sinuated on each side behind the eyes; purplish copper, very brilliant, finely and densely punctured, margined with bluish green at the sides and base. Scutellum semiorbicular, polished, bluish green, with a few punctules. Elytra concolorous with the thorax, more coarsely punctured, the punctures arranged in indistinct striæ continued to the apex; the suture narrowly bluish green. Beneath, with the legs, cyaneous; hairs of the tibiæ and pulvilli pale fulvous.

Hab. Sarawak, Borneo; discovered by Mr. Wallace.

In the collections of the Rev. H. Clark, Mr. Baly, and the British Museum.

Subg. vi. (*Erigenes*, nobis: *Platycorynus*, Baly). *Antennæ* arti-

culis 5 ultimis leviter compresso-dilatatis, ultimo oblongo, apice triangulo s. acuminato: *palpi maxillares* articulo ultimo ovato, penultimo globoso. *Thorax* supra hemisphæricus, latus, antice gibbosus, post oculos haud sinuatus, lateribus rotundatis, margine basali leviter bisinuato. *Antepectoris processus anterolateralis* perbrevis, triquetrus, ab angulo thoracis plus quam suam ipsius longitudinem distans. *Scutellum* semiellipticum. *Elytra* thorace vix latiora, postice levissime ampliata, oblonga, convexa, apice subito rotundata. *Pedes* tibiis anticis elongatis, incurvatis; unguium appendiculis brevibus, apice tantum liberis, vix acutis. *Corpus* breviter oblongum, valde convexum.

54. C. CIRCUMDUCTUS.

C. breviter oblongus, parallelus, thorace gibboso; violaceus, elytris aureis, margine laterali anguste suturaque violaceis; thorace crebre fortiter punctato, elytris punctato-striatis; scutello violaceo.

Long. 4½ lin.; lat. hum. 2 lin.

Thorax very convex, in front gibbous, not sinuated behind the eyes, coarsely and thickly punctured. Front rugose between the eyes. Elytra bright golden or purplish copper-coloured, with the suture, and the lateral margins very narrowly, violaceous. The rest of the insect is entirely violaceous. The anterior tibiæ of the ♂ are elongate and strongly curved, of the ♀ shorter, and slightly curved.

Hab. India.

In the collections of the Rev. H. Clark and the British Museum.

55. C. PRETIOSUS, *Baly*.

Platycorynus pretiosus, *Baly, Descriptions &c.* p. 4.

Hab. India.

In the collections of the Rev. H. Clark and Mr. Baly.

Subg. vii. (*Bathycolpus*, nobis: *Platycorynus*, Baly). *Caput* verticale, thoraci profunde insertum; oculis levissime emarginatis. *Antennæ* articulis post 4$^{\text{tum}}$ plus minus incrassatis, subcompressis; articulus ultimus apice obtusus: articulus 1$^{\text{mus}}$ oblongus, crassus, extus convexus; 2$^{\text{dus}}$ quadruplo minor, extus apice convexus; 3$^{\text{tius}}$ 2$^{\text{do}}$ duplo longior, tenuis, cylindricus; 4$^{\text{tus}}$ 3$^{\text{tio}}$ brevior, cylindricus. *Thorax* plerumque transversus, antice globosus, non angustatus, gibbosus, caput ad oculos usque complectens. *Antepectoris processus anterolateralis* triquetrus, ab angulo thoracis suam ipsius longitudinem distans. *Scutellum* rotundatum, interdum utrinque subsinuatum. *Elytra* convexa, parallela, breviuscula, humeris valde obtusis. *Pedes* breves, validi, ungues appendiculis parvis, vix apice liberis.

56. C. IGNICOLLIS, *Hope.*

Hope, Trans. Ent. Soc. vol. iv. p. 17.—Chrysochus thoracicus, *Baly, Ann. & Mag. N. H.* August 1859.

C. oblongus, convexus, cylindricus, cæruleo-niger, capite æneo-viridi; thorace aureo, splendido, subtiliter punctulato; antennis nigris, articulis 4 basalibus apice fulvescentibus; elytris fortiter striato-punctatis, striis apicem versus levioribus.

Long. $3\frac{3}{4}$ lin.; lat. hum. $1\frac{2}{3}$ lin.

Face metallic green, tinged with gold between the eyes, longitudinally furrowed, distinctly and rather closely punctate. Eyes golden. Antennæ of the ♂ twice as long as the thorax, of the ♀ shorter, the apical joints much dilated, almost as in *Corynodes*; the minute 12th joint triangular, exserted. Thorax globose and scarcely angustate in front, rounded at the sides, rather narrower than the elytra, punctulate when seen under a lens, bright coppery or gold-coloured. Elytra parallel, cylindrical, of the ♂ elongate and rather narrow, of the ♀ broader and more convex; very obtuse at the shoulders, punctate-striate, the punctures more profound towards the humeral angles. Underside and legs black, with or without a bluish tinge; pubescence of the tibiæ and tarsi fulvous.

Hab. China.

Var. Thorax concolorous with the elytra.

Frequent in collections.

Genus ACROTHINIUM, *nobis.*

Caput verticale, ad oculos thoraci insertum, oculis prominulis, ovatis, supra ampliatis, integris. *Antennæ* articulis 5 ultimis leviter dilatatis, compressis; articulo 1^{mo} magno, ovato; 2^{do} cylindrico, curvato, brevi; 3^{tio} ad 6^{tum} elongatis, filiformibus; 6^{to} breviore quam præcedens; 7^{mo} conico, cæteris longiore; ultimo apice triangulo, s. acuminato. *Thorax* transversus, elytris parum angustior (♀), s. oblongus, attenuatus, elytris multo angustior (♂); antice et lateribus rotundatus, basi truncatus, post oculos vix bisinuatus. *Antepectoris processus anterolateralis* trigonus, ab angulo thoracis suam ipsius longitudinem distans. *Scutellum* semiellipticum. *Elytra* (maris) lata, brevia, dorso subdepressa, lateribus parallelis, apice subito clausa; (feminæ) magis oblonga et convexa; in utroque sexu antice transversim subimpressa. *Pedes* longi, validi, tibiis extus apice fortius angulatis: unguium appendiculis vix apice liberis.

Type of the genus, *Chrysochus Gaschkevitchii*, Motsch. Etud. Ent. ix. p. 23. The more strongly dilated antennæ appear to separate this insect from *Chrysochus* and to approximate it to *Corynodes*, while in habit it more resembles the former genus. It is a common insect in Japan and Northern China, and has been named after Madame Gaschkevitch, wife of the Russian envoy at Khakodody.

Genus CHRYSOCHARES, *Moravitz.*

Moravitz, Horæ Soc. Ent. Rossicæ, t. i. p. 159.—Chrysomela, *Linn.*, *Pallas.*—Eumolpus, *Fab.*—Chrysochus *of modern writers.*

C. ASIATICUS, *Linn.*

Linn., Gmelin, i. 4. p. 1670. no. 91. *Pallas, Icon.* t. G. fig. 1. *Fab. El.* i. 419. 3. *Schönh. Syn. Ins.* i. 2. p. 234. no. 5. *Küst. Käf. Eur.* i. 97.
Hab. S. Russia, Caucasus.

Common in collections.

Genus CHRYSOCHUS, *Redt. Fn. Austr.* 894.

Moravitz, Horæ Soc. Ent. Ross. t. i. p. 159.—Chrysomela et Eumolpus, *Fab.*, &c.—Cryptocephalus, *Schneider, Mag.* p. 218.

1. C. PRETIOSUS, *Fab.*

Fab. Ent. Syst. i. 324. 85; *El.* i. 419. 5. *Panz. Fn.* 44. 13. *Schneider, l. c.* no. 20. *Schönh. Syn. Ins.* i. 2. p. 235. no. 8. *Küst. Käf. Eur.* i. 96.
Hab. Central and Southern Europe; Central Asia.

Common in collections. This species appears to have a wide range; four individuals in Mr. Clark's collection, ticketed "China," are indistinguishable from those of Europe.

2. C. PUNCTATUS, *Gebler.*

Gebler, Bull. Mosc. 1860, no. 3. p. 36.—*Hab.* Kirghiz Steppes.

I have not seen this species.

3. C. CHINENSIS, *Baly.*

Baly, Ann. & Mag. N. H. August 1859.—*Hab.* N. China.

In the collections of the Rev. H. Clark and Mr. Baly. It is perhaps the same as *C. exquisitus*, Eschscholtz, from Dauria. Some insects of Chevrolat's collection, bearing this name, are rather smaller than the Chinese examples, but present no other difference whatever. Having been unable to find any description of *C. exquisitus*, Esch., I conclude that the name is only MS.

4. C. PULCHER, *Baly.*

Baly, Descriptions &c. p. 1.—*Hab.* Malay peninsula.

Discovered by M. Mouhot, and in the collections of the Rev. H. Clark and Mr. Baly.

The following species are from North America; they are somewhat more elongate in form, but possess no characters sufficiently salient to justify the establishment of a new genus.

5. C. AURATUS, *Fab.*

Fab. Ent. Syst. i. 325. 87; *El.* i. 419. 6. *Oliv.* 903, pl. 1. fig. 12. *T. W. Harris, Massachusetts Reports, Insects,* p. 108.

Hab. United States. Common in collections.

6. C. COBALTINUS, *Lec.*

Leconte, Reports of Surveys &c. no. 1. p. 67.

Hab. Oregon and California.

In the collections of the Rev. H. Clark and the British Museum.

7. C. CALIFORNICUS.

C. elongatus, cylindricus, cæruleo-viridis, metallicus; oculis rufis, antennis piceis; thorace subtiliter punctulato, punctis majoribus interjectis, antice gibboso, lateribus rotundato-ampliatis, basin versus subrectis, angulis posticis rectis; elytris confertim punctulatis; scutello lævi, purpureo; pedibus cæruleo-viridibus.

Long. 5 lin.; lat. hum. 2¼ lin.

This and the two next are allied to *C. cobaltinus,* Leconte. The present species differs from that insect in being somewhat larger, and of a shining bluish-green colour, instead of dark blue. The thorax is broader in proportion, much more gibbous at the sides and in front, and more profoundly punctured. The underside and legs are concolorous, thinly scattered with short pale ferruginous hairs; the claws are pitchy.—*Hab.* California.

8. C. TENEBRICOSUS.

C. præcedenti affinis, totus ater, minus nitidus; thorace antice parum gibboso, lateribus rectis, basin versus vage et fortiter punctato, præsertim apud angulos posticos.

Long. 5 lin.; lat. hum. 2½ lin.

Distinguished from the preceding, and from *cobaltinus,* Leconte, by the thorax, which is neither gibbous in front nor laterally dilated. The scutellum is brown, shining, and impunctate. The elytra are broader in proportion to their length than those of *Californicus,* but similarly punctured. The entire insect is of a black colour, slightly tinged with dull blue, and on the elytra, in certain lights, with purple.

Hab. California.

9. C. CASTANEUS.

C. elongato-ovatus, subdepressus, supra saturate castaneus, nitidus, punctulatus; subtus testaceus; antennis pedibusque castaneis.

Long. 4 lin.; lat. hum. 1¾ lin.

Vertex finely punctured, with a deep oblong vulviform impression. Thorax transverse, very slightly dilated at the sides, not distinctly gibbous in front, densely covered with irregular punctures of two different sizes, which are especially numerous towards the posterior angles. Elytra more finely punctulate, the punctules forming indistinct striæ. Beneath pale testaceous, the sternal plates and legs darker, inclining to castaneous.—*Hab.* California.

The coloration of this species, so different from its congeners, might induce the suspicion of its being immature. If so, it is still distinct from any other species that I have met with.

Notice of a nearly Complete Skeleton of a *Dinornis*, presented by Dr. GIBSON to the Museum of the Yorkshire Philosophical Society. By THOMAS ALLIS, Esq., F.L.S., Hon. Sec. Yorksh. Phil. Soc.

[Read June 16, 1864.]

(Abstract.)

IN the course of last summer, Mr. Allis had an opportunity, on the occasion of Dr. Gibson and his brother, who is a resident in New Zealand, visiting the Museum of the Yorkshire Philosophical Society, to suggest to those gentlemen how desirable it would be if the Museum could obtain some bones of the *Moa*, of which it possessed only a single small fragment. Mr. Allis was, at the same time, anxious to procure a specimen of the *Apteryx*, with a view of his tracing out the rudimentary wing-bones in that bird.

A few weeks since, Mr. Allis was informed by Dr. Gibson that his brother had succeeded in obtaining a perfect skeleton of the *Moa*, as well as an *Apteryx* and some of its eggs, all of which had been forwarded to England. This collection reached the York Museum at the end of May, and, when examined, was found to contain a very nearly complete skeleton of a gigantic species of *Dinornis*, together with numerous bones belonging to four distinct young birds of the same species The best-marked of these bones were an ischium, an os pubis, a few ribs, and a small cruciform bone (the immature sternum). Before the skeleton was mounted, some photographic views of the bones were taken, copies of which were exhibited to the Society. One of the photographs shows the inner aspect of the sacrum; the three anchylosed vertebræ adjoining the sacrum, with their ribs still attached by cartilage to them;

the next dorsal rib, attached in like manner; the bones of the inner toe of the left foot, kept in position by cartilage; the phalanges exposed on their upper surface, with the periosteum entire, but retaining on their under surface the whole of their cartilage and also the outer integument of the sole. The head, with the exception of the loss of the left zygomatic bone, is as perfect as it would have come from the hands of the most expert anatomist, and without a trace of foreign matter on its surface. The tympanic bones retain the normal action they have in the living bird. A portion of the outer skin adheres to one of the fibulæ. Three of the dorsal ribs have articulating surfaces and cartilage at their lower end,—evidence of there being three sternal ribs on each side, although but two are represented in the only published figure Mr. Allis has had access to. The sternum is also shown with three of its ribs *in situ*; the sides of that bone are unsymmetrical, probably arising from injury in early youth. The second photograph shows the femur, with the still flexible *ligamentum teres* and the articular cartilage on its head, and having a portion of skin attached to it; a view of the under surface of the head, with its detached mandible; a view of the sternum, showing its anterior border, with the fossæ, in which are the articulating surfaces for the attachment of the anterior limbs; the tarsus; and an outer view of the pelvis; together with a considerable portion of the skin, studded with the quill-parts of the feathers, which are bifid as in the Emu; some of the feathers preserve a portion of the web.

A bystander attempted, by a sudden jerk of the hand, to pull out one of the feathers, but did not succeed in doing so; the feather would neither move nor break, but, slipping through the fingers, retained its position, texture, and elasticity alike uninjured.

Besides these parts, the same photograph exhibits a view of the eight caudal vertebræ, retained in their proper relative position by the cartilage on their under surface; and the os coccygis, which differs in form from that of any other bird, having two finely-pointed processes pointing upwards, beautifully preserved.

The other bones received consist of nine true cervical vertebræ; how many are wanting is unknown, but at least two or three, as well as the atlas; two dorsal vertebræ with short ribs (the upper pair is wanting); next in order a single vertebra, with the left rib attached; then three others normally anchylosed, and all with the left rib attached to them. The first sacral vertebra has one of its ribs attached by cartilage, the other detached; the next two have ribs anchylosed to them. Of the nine left dorsal ribs, seven retain their cartilaginous attachment to the vertebræ just as they were when the bird was alive, and one of the nine is missing. The posterior limbs are perfect, except in the loss of the middle toe of the left foot. When all the bones had been placed in proper order on the table, one was left for which no place could be found, the unusual shape of which rendered it difficult to form an opinion as to what it was; it was evident, however, that it belonged to an adult bird; and Mr. Allis soon convinced himself that it was the rudimentary wing-bone for which he had before sought in vain; it was less than an ounce in weight.

The most striking peculiarity of this skeleton is its great strength, especially in the neck. The cervical vertebræ want those acicular processes which are found on the under side of those bones in the Ostrich, and bear in this respect a closer resemblance to those of the Emu.

The bones wanting to complete the skeleton are the left zygomatic, the atlas, two or more of the upper cervical vertebræ, the first pair of dorsal ribs, the first pair of sternal ribs and the third left sternal rib, one of the rudimentary anterior limbs, and the left middle toe.

With respect to the species of *Dinornis* to which these bones belong, Mr. Allis is uncertain. Looking at the general character of the skeleton, no more appropriate name could be found than "*robusta*;" but whether it be *D. robusta* of Prof. Owen is doubtful. Dr. Gibson has carefully measured the leg-bones, and does not find them agree in all respects with any described by Prof. Owen, though the difference, Mr. Allis suggests, may possibly be only sexual.

It appears that the skeleton was discovered by some persons who were on a "prospecting" expedition in search of gold, almost completely buried in a heap of sand, and having beneath it the bones of the four young ones. Judging from the condition of the cervical vertebræ, Mr. Allis is of opinion that the bird was buried with its body and head bent down, whilst the neck, arching upwards, was more exposed,—all the bones of the trunk and limbs, and of the head itself, being perfectly preserved, and apparently in a quite fresh condition, with their articular cartilages entire, and ligaments flexible and strong; whilst the middle cervical vertebræ were much weather-worn, and evidently had suffered from exposure above the surface of the ground.

The Œsophagus of the Ruminantia*. By WILLIAM RUTHERFORD, M.D., Resident Surgeon, Royal Infirmary, Edinburgh; formerly Demonstrator of Anatomy at the Royal College of Surgeons, Edinburgh; President of the Royal Medical Society. Communicated by JOHN ANDERSON, M.D., F.L.S.

[PLATE III.]

[Read June 16, 1864.]

THE muscular structure of the œsophagus of the Ruminantia seems to have been a subject which, nearly two centuries ago, attracted a considerable share of attention; for, in Peyer's work on the Ruminantia, the opinions of no fewer than twelve distinguished anatomists are quoted in reference to it.

In recent times it has not, so far as I have been able to ascertain, been re-examined, except perhaps by Mr. Spencer Cobbold (Todd's Cyclopædia of Anatomy and Physiology).

I have not been able, however, to meet with any description which at all approaches the truth. I will briefly allude to the opinions of previous authors before giving the results of my own investigations.

The first writers on this subject appear to have been Aponensis and Æmylianus, who said that the muscular fibres are arranged in two layers, the outer consisting of longitudinal, the inner of transverse fibres.

Aquapendentius and Guilandinus accepted this description; and Galen expressed the opinion, that while the food was swallowed by all the fibres, it was returned to the mouth through the action of the transverse ones only. On the other hand, Fabricius and Fallopius went so far as to say that the Ruminant's œsophagus contained no muscular fibres at all, but that it was composed of a peculiar tissue met with in no other part of the animal.

Stenson described the muscular fibres as forming double spirals, the bundles running spirally from one end of the œsophagus to the other, forming two layers, which interlace at two raphes; so that the same bundle, while running from one end to the other, lies alternately in the inner and outer layer.

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* Being a portion of a Thesis for which a Gold Medal was awarded by the Senators of the University of Edinburgh at the Graduation in 1863. The Thesis was accompanied by numerous dissections and models, which were examined and approved of by Professor Goodsir and the other Members of the Medical Faculty, and are now in the University Museum.

Bartholinus and Grew's accounts somewhat resemble this; but they thought that there was an internal and also an external series of double spirals. Ducernus, Delphinus, and Willis adopted Stenson's description; and Peyer's account, though evidently intended to be original, does not differ from Stenson's, excepting that it is a more lucid and intelligible exposition of a mistaken notion as to the structure.

Monro (Secundus) has, in a thesis on dysphagia, mentioned the fact that the muscular fibres in the Ruminant's gullet cross each other like the lines of the letter X. But this was nothing new; it had been pointed out long before; and it is a fact which any one might perceive almost at a glance.

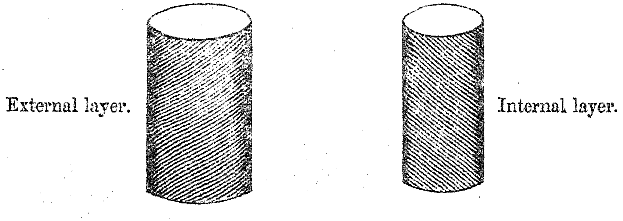
Dr. Spencer Cobbold's description * is the latest. He says that the muscular fibres are arranged in two layers, the *outer* "transversely circular," the *inner* "obliquely longitudinal."

These descriptions are all incorrect. Certainly Stenson's is nearer the truth than any of the others; but it is, nevertheless, wide of the mark.

After prolonged and careful dissection, I feel convinced that the following will be found to be the true description.

The muscular structure of the œsophagus consists of two layers of fibres running in an oblique direction. The fibres of both layers do not, however, run in the same direction, but cross each other like the letter X. The two layers are everywhere separable, except at two lines, which are exactly opposite each other, and run from one end of the gullet to the other, dividing it longitudinally into two symmetrical halves. (Plate III. fig. 2.)

Fig. 1.



These lines I shall call the *decussations*; for there the two layers intermingle, the inner layer of either side passing out to become the outer layer of the opposite side; that is to say, the inner layer of one side passes outward, to become the outer layer of the opposite side, and, in so doing, crosses and interdigitates with the inner layer of the other side as it runs outwards also.

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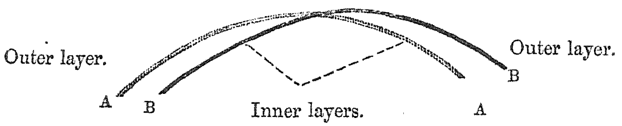
* Todd's Cyclopædia of Anatomy and Physiology.

Fig. 2.



Inner layer (A) becomes the outer layer (A).
Inner layer (B) becomes the outer layer (B).

On examining one of the lines of decussation more minutely on both its outer and inner aspects (Plate III. figs. 1 & 3), it will be observed that, whereas internally the crossing is clear and distinct, externally it is obscure. This is caused by bundles of fibres of the outer layer, which, instead of dipping down to become internal, continue over the decussation to the outer layer of the other side (Plate III. fig. 1, A). These fibres, for the sake of convenience, may be termed the non-decussating bundles—an incorrect term, however; for, if these bundles be traced round to the other line of decussation, they will *always* be found to decussate there, and pass into the inner layers. Further, the concavity of the non-decussating bundles (for they all run obliquely) (fig. 7) looks at the one decussation upwards, at the other downwards. At both decussations, *all* the fibres of the inner layers run into the outer layers; but *all* the fibres of the outer layers do not, in like manner, run into the inner layers, but the *half* of the fibres of the outer layer of one side runs *over* the decussation into the *outer* layer of the other side; and whether you trace these non-decussating bundles upwards from the one decussation, or downwards from the other, they will always be found to decussate at the decussation of the opposite side, so that they do not form a layer of *circular* fibres.

Fig. 3.

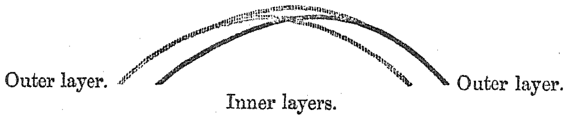
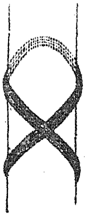


Fig. 4.

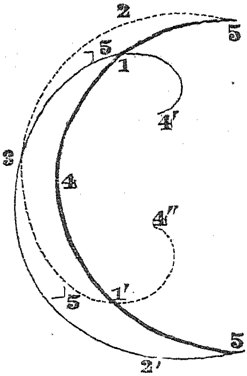


A bundle of fibres not decussating at one decussation, running round to the other (decussation), and there decussating.

The great difficulty in ascertaining the structure lies in tracing these non-decussating bundles from one decussation to the other; for an intermingling of the fibres of the outer layer takes place between the decussations (Plate III. fig. 2, F). The non-decussating bundle (which is external to everything at the one decussation), when traced downwards, *e.g.*, gets below the non-decussating bundle coming up from the other decussation; while the latter, in turn, gets below the former; so that at both decussations the non-decussating bundles are necessarily external, while the decussating bundles are internal (*vide* Fig. 7).

Fig. 5.

Diagrammatic representation of the course of the fibres in one lateral half of the gullet, including both decussations.

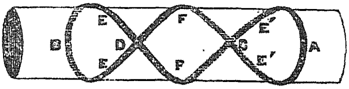


1, 1′. The two lines of decussation.
2, 2′. Non-decussating bundles.
3. Crossing of the fibres forming the outer layer.
4, 4′, 4″. Inner layers.
5. Outer layers.

It would be an easy task to trace these bundles in the outer layer, did the fibres of both bundles not intermingle as they cross each other; but the bundles break up into their finest fibres, thereby rendering the interdigitation very minute and difficult to trace (Plate III. fig. 2, F). I have often failed to do so, but I have succeeded a sufficient number of times to warrant my advancing the above description as correct. Now, *all* the fibres of the inner layers, whether traced upwards or downwards, will always be found to decussate (except at the lower end of the œsophagus); and if they be traced onwards in the outer layers, they will be found to form the non-decussating bundles at the *next* decussation (*vide* Fig. 7, A′ & B′). This being true, the structure is simply this:—Each bundle of fibres forms a perfect loop, which crosses the œsophagus obliquely three times (Fig. 6). That is to say, a bundle of fibres (A, Fig. 6) in the outer layer, which runs over a decussation without decussating, when traced round to the other decussation (C) is there found to decussate and pass into the inner layer (F F), in which it crosses the gullet a second time and again decussates (D), passing into the outer layer (E E), in which it crosses the gullet for the third time, and forms at B the non-decussating bundle; so that the one *extremity* (so to speak) of the loop is *above*, on the one side of the œsophagus, while the other extremity is *below* and on the opposite side. The same bundle is twice in the external, but only once in the internal layer; hence it is that the outer layer contains twice as many fibres as the inner layer; it is not, however, twice as thick, because it contains much less cellular tissue than the inner layer, and is, in consequence, more compact than that layer.

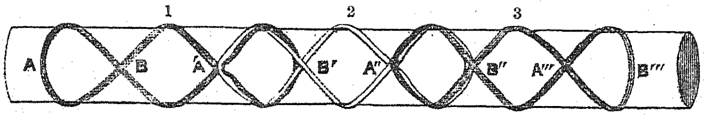
The fact which must more especially be borne in mind is, that the bundles of the inner layer, when traced either upwards or downwards, *always* decussate at the nearest decussation; and when traced onwards in the outer layers they form the non-decussating bundles at the next decussation. If this fact be for a moment thought over, it will be seen how impossible it is to draw from it any but the above conclusion as to structure, viz. that the bundles form perfect loops, crossing the gullet three times (Fig. 6). The manner in which the loops are linked together, so as to form a continuous tube, is extremely ingenious. A diagram will, however, explain the arrangement better than any description (Fig. 7).

Fig. 6.



Drawing from a model made with an india-rubber band upon a cylinder of wood. It shows the essential element in the structure, viz. a continuous band of fibres crossing the œsophagus three times; it begins at A (which is a line of decussation) on one side, and ends at B (the other line of decussation) as a *non*-decussating bundle on the other side. At A, B, and E′, E, it is in the outer layer; it decussates at C and D, between which, F, F, it is in the inner layer; so that it is twice in the external, but only once in the internal layer: it decussates at both decussations C and D, and also forms non-decussating bundles at both A and B.

Fig. 7.



Drawing from a model made with three india-rubber bands instead of one, to show how the bands are connected one to another.

When the band 1 is decussating for the second time at A′, the band 2 begins as the non-decussating bundle, which, it will be observed, is external to the decussating bundles; as the second band runs round to the opposite decussation, B′, it gets in below the first band, which ends at B′ (external to the second bundle) as the *non*-decussating bundle. In the drawing, the first band has been folded round the second band between A′ and B′. The same arrangement as that described occurs when a third band is added (between A″ and B″), and so on.

The first turn of the first band (A) and the last turn of the third band (B‴) are necessarily incomplete, owing to the want of other bands. Between A and

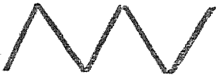
B, A′ and B′, A″ and B″, A‴ and B‴, the bands form the outer layer, which, however, is structurally complete only between A′ and B′, A″ and B″. The bands form the inner layer between B and A′, B′ and A″, B″ and A‴. The inner layers, unlike the outer, are, on the model, all perfect; it will be observed that they contain only single bands, and are, in consequence, only half as thick as the outer layers between A′ and B′, A″ and B″, which have double bands.

The whole could be converted into a solid tube by multiplying the bands, thereby filling up the open spaces.

Just before the gullet joins the stomach, the inner layer becomes very much thicker than the outer layer, owing to the presence of circular fibres, which probably act as a sphincter.

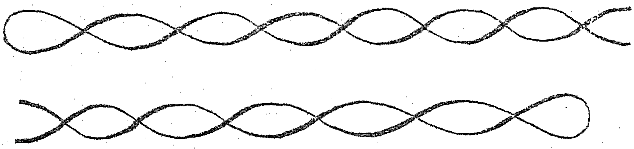
Two other theories suggested themselves to me in the course of my investigations:—First, that although a perfect loop, the bundle might be longer than I now suppose it to be; that is, instead of crossing the œsophagus only thrice, it might do so oftener, say five or seven times (Fig. 8). This I soon abandoned; for I found that *all* the fibres of the inner layer, after passing into the outer, become non-decussating at the next decussation, which could not be the case if the loop crossed the gullet more than three times; and, moreover, I found that at a decussation the *non*-decussating bundle is as large as the decussating bundle, which could not be the case were this long-loop view correct.

Fig. 8.



The same facts overthrew the other theory which suggested itself to me, viz. that the fibres form long bundles, beginning by loops at the decussations—at one decussation the convexities of the loops pointing downwards, and the bundles running spirally to the upper extremity of the œsophagus, while at the other decussation the convexities of the loops point upwards, and the bundles run spirally towards the lower extremity. According to this view, the gullet would certainly have been of equal thickness throughout; but its truth is negatived by the same facts which oppose the long-loop view, viz. that the non-decussating bundles at the decussation are as large as the decussating bundles, and

Fig. 9.

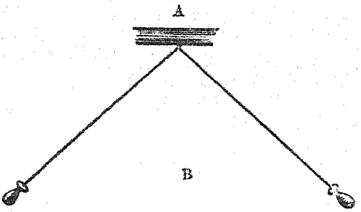


all the fibres of the inner layer, when traced round in the outer layer, become non-decussating at the first decussation at which they arrive after having entered the outer layer*. I have calculated that, were this last theory true, the decussating bundle, at a decussation, would be ten times as large as the non-decussating; because a spiral running from the one end of the œsophagus to the other would cross it nine or ten times.

Now, what is the use of this remarkable and beautiful arrangement of the fibres? Is it to enable the animal to ruminate? It would be difficult to conceive why so elaborate and ingenious a structure should be required to bring the food *back* from the stomach; for the simpler human œsophagus, with its longitudinal and transverse layers, ought to be just as able to carry the food *up* from the stomach as to take it down; and that it is so is shown by the act of vomiting. And further, the idea that it is a special provision for rumination is proved to be erroneous by the fact (as I have ascertained) that the œsophagus of the dog has the same structure as that of the Ruminant. I have not examined the œsophagus of any of the other Carnivora; but the above is true of the dog's, at any rate.

The advantage gained by a structure such as this, seems to be, 1st, *rapidity of transmission.* A body at A, if pulled by two oblique strings, will be advanced to B more rapidly than if these strings were pulled directly before the body, supposing the power moves at the same rate in both cases. When the strings are oblique, however, although rapidity of transmission is gained, there is a loss of power.

Fig. 10.



A bundle of fibres of the inner and outer layers, when viewed in relation one to another, form a parallelogram (*vide* Fig. 11).

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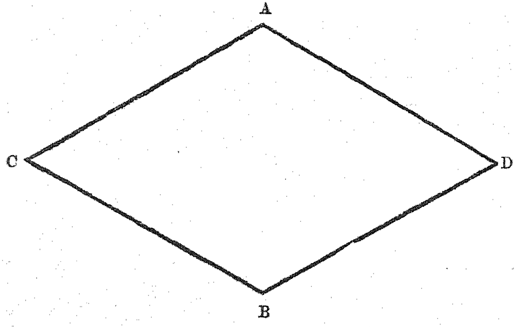
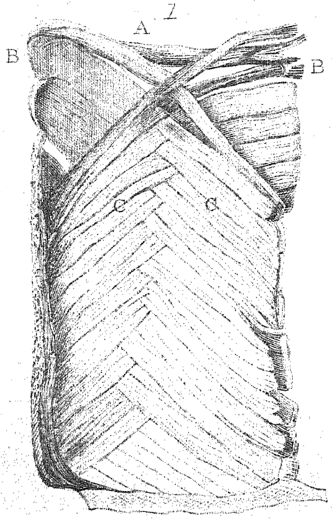
* I have frequently used the term "layer" both in the singular and plural numbers: *e. g.* the term "inner layers" refers to the internal layers of both of the symmetrical halves into which the œsophagus may be longitudinally divided, while "inner layer" refers to the internal layer of one of these halves.

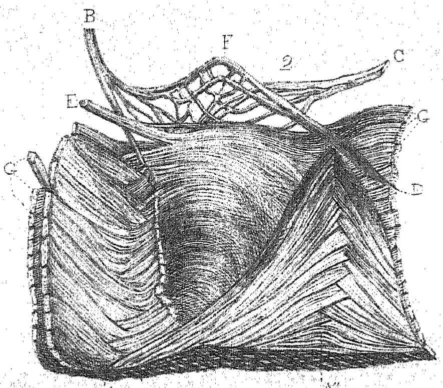
During contraction, the points A and B, and also C and D, are approximated. By the approximation of A to B the gullet is more rapidly *shortened*, and by the approximation of C to D it is more rapidly *constricted*, than is the human gullet by the action of the longitudinal and circular fibres; and thereby a bolus is carried more rapidly along the Ruminant's gullet than along Man's, or that of a Bird with its circular fibres only. This is a great advantage in the case of the Ruminant; for the slow passage of so much food backwards and forwards would very seriously interfere with respiration by pressing upon the trachea. But, on the other hand, why should the carnivorous animal have such an œsophagus? This fact renders necessary a second explanation, viz. *that by this arrangement great strength is gained.* The same number of fibres as are present in the human gullet would form a much stronger and more compact tube if interwoven in a manner similar to that in the Ruminant's œsophagus; for the fibres are so closely interlaced, that separation of them is extremely difficult; while, in the human gullet, the fibres are more apt to separate when pressing upon a hard bolus. And as the muscular tunic of even the dog's and sheep's gullet is thicker than that in the human subject, *strength*, in addition to rapidity of transmission, is certainly gained. I have often been astonished (before I knew the structure of its gullet) at the large masses of unchewed food which a dog can readily swallow.

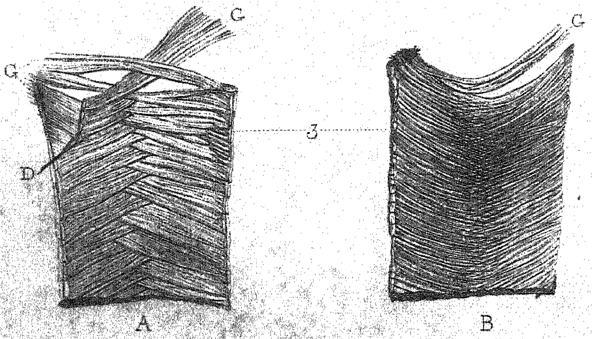
Fig. 11.



I have examined the sheep's œsophagus more especially; for that of the ox, though having the same structure, is much more difficult to dissect on account of the greater brittleness of its fibres when boiled. I have not examined the gullet of any other Ruminant, as I have been unable to procure any other.







G. Jarman sc.

Finally, the Ruminant's œsophagus differs widely from the human as regards the microscopic character of its muscular fibre; for while in the human gullet there is a mixture of striped and unstriped fibres, in the Ruminant's they are all of the striped variety.

In conclusion, I have to acknowledge my obligations to my friend Mr. Deas, to whose kindness I owe the beautiful and very accurate drawings which illustrate this paper.

EXPLANATION OF THE PLATE.

Plate III.

Fig. 1. Portion of sheep's gullet, twice the natural size (seen from within). The fibres of the internal layer, c c, are seen decussating and running into the external layer, b b; while at a is seen a *non*-decussating bundle passing outside the decussation, from the outer layer of the one side of the decussation to that of the other side.

Fig. 2. The entire circumference of a sheep's œsophagus, seen from within (natural size). It has been simply slit open and dissected. Above, a′, a″, are seen the two lines of decussation; b, a bundle of fibres which has not decussated at the decussation a′; and c, a similar bundle which has not decussated at a″. d, a bundle of fibres of the inner layer which decussates at the line of decussation a″; and e, a similar bundle which decussates at the line a′. d runs up to form b, and e goes to form c, both in the outer layer; below f they separate into their finest fibres and interdigitate one with another. g g, outer layer.

Fig. 3. Two portions of the œsophagus of a sheep (natural size), to show the difference between the inner and outer aspects of the line of decussation. In a it is seen from the inside. All the fibres decussate, so that the decussation is sharp and well defined; but on the outside, b, it is much obscured by the non-decussating fibres, which, instead of dipping down as in a, run across from one side of the line to the other. g g, outer layers. d, inner layer.

Descriptions of New Species of Hymenopterous Insects from the Islands of Sumatra, Sula, Gilolo, Salwatty, and New Guinea, collected by Mr. A. R. Wallace. By Frederick Smith, Assistant in the Zoological Department, British Museum. Communicated by W. W. Saunders, Esq., V.P.L.S.

[Plate IV.]

[Read June 2, 1864.]

The collections of Hymenoptera which are described in the following list contain several insects of especial interest. Three new genera of Formicidæ are characterized. The insect which forms the type of the new genus *Cephaloxys* is one of the most anomalous forms hitherto discovered, belonging to the Cryptoceridæ: viewed above, it would appear to be a blind Ant; but further examination reveals the fact of the eyes being situated on the underside of the head—a circumstance unparalleled in the Formicidæ. Figures of some of the more interesting genera and species are given, including the Tenthredinidous genus *Cladomacra*, the males of which have the antennæ beautifully pectinated. A new species of the genus *Pterochilus* is described, and is undoubtedly the finest discovered belonging to that genus of Wasps.

Fam. TENTHREDINIDÆ, *Leach.*

Gen. Selandria, *Leach.*

1. Selandria Doryca, *Smith, Proc. Linn. Soc.* v. p. 135.
Hab. Salwatty.

Gen. Cladomacra, *Smith.* (Pl. IV. fig. 1, ♂.)

1. Cladomacra macropus, *Smith, Ann. & Mag. Nat. Hist.* (1860) vi.
Hab. New Guinea.

Fam. CHRYSIDIDÆ, *Leach.*

Gen. Chrysis, *Latr.*

1. Chrysis intrudens. *C.* viridi-cyanea; capite thoraceque confertissime punctulatis; abdominis segmentis delicatule punctatis, apice sex-dentato; alis subhyalinis.

Length 4½ lines. Blue-green, abdomen brightest green and subopake; head and thorax closely and strongly punctured; the flagellum black; the tarsi fuscous, with the basal joint green outside; wings subhyaline. Abdomen finely punctured, the basal segment most strongly so; the extreme base of the second and third segments blue-black; the apical segment with six acute spines.

Hab. New Guinea.

This species belongs to the fifth section of the eighth phalanx of Dahlbom's divisions of the Chrysididæ, and is evidently quite distinct from any of the species described by that author.

Fam. EVANIADÆ, *Leach.*

Gen. Megischus, *Brullé.*

1. Megischus coronator, *Fabr. Syst. Piez.* p. 118 (♀).
Hab. Morty Island; Salwatty.

Fam. ICHNEUMONIDÆ, *Leach.*

Gen. Mesostenus, *Brullé.*

1. Mesostenus multipictus, *Smith, Proc. Linn. Soc.* vii. p. 8.
Hab. Salwatty.

2. Mesostenus arrogans. *M.* niger; antennis medio albis; thorace pedibusque albo variegatis; abdominis marginibus fasciis albis; alis hyalinis.

Female. Length 5 lines. Black; the face, mandibles, inner orbits of the eyes, and the sixth to the fourteenth joints of the antennæ white. The thorax finely punctured above; a spot on each side of the prothorax, the tegulæ and a spot beneath them, the scutellum, and the margin of the truncation of the metathorax white; the anterior and intermediate legs, a spot on the posterior coxæ above, the base of the trochanters, the outside of the tibiæ, and two basal joints of the tarsi white; the anterior and intermediate tarsi and the apical joints of the posterior pair fuscous; three white spots on each side of the thorax; the metathorax with two spines; the wings hyaline and iridescent; the posterior femora ferruginous. The apical margins of the segments of the abdomen white; the fifth segment has a widely interrupted fascia in the middle.
Hab. New Guinea.

Gen. Cryptus, *Fabr.*

1. Cryptus tarsatus, *Smith, Proc. Linn. Soc.* vii. p. 7.
Hab. New Guinea.

2. Cryptus volatilis, *Smith, Proc. Linn. Soc.* vii. p. 7.
Hab. New Guinea.

3. Cryptus ducalis. *C.* ferrugineus, mandibulis thoraceque lateribus nigris; abdominis angulis duabus nigris; alis flavo-hyalinis.

Female. Length 10 lines. Ferruginous; the antennæ pale ferruginous, with ten or eleven of the apical joints black; the mandibles bidentate, their tips black. An indistinct fuscous stripe on each side of the mesothorax above; the sides of the thorax and the posterior coxæ black; the wings yellow hyaline, the nervures ferruginous. Abdomen with two black rings; the first narrow and situated at the base of the second segment; the other broad, occupying the third, fourth, fifth, and base of the sixth segments; the seventh segment with two black spots at its base; the second segment also has two indistinct spots beyond the black band; the ovipositor the length of the abdomen.
Hab. Morty Island.

Gen. Pimpla, *Fabr.*

1. Pimpla insidiator, *Smith, Proc. Linn. Soc.* vii. p. 9.
Hab. New Guinea.

2. Pimpla braconoides, *Smith, Proc. Linn. Soc.* iii. p. 172.
Hab. New Guinea.

3. Pimpla penetrans, *Smith, Proc. Linn. Soc.* iv. p. 173.
Hab. Salwatty.

4. Pimpla integrator, *Smith, Proc. Linn. Soc.* v. p. 141.
Hab. Morty Island.

5. Pimpla flaviceps, *Smith, Proc. Linn. Soc.* v. p. 139.
Hab. Morty Island.

6. Pimpla obnoxia. *P.* flavo-ferruginea; antennis nigris; alis fuscis, basi flavo-hyalinis.

Female. Length 6 lines. Reddish yellow, the legs and body beneath palest; the thorax shining above; the head pale testaceous; the antennæ black; the wings dark fuscous, their base yellow hyaline, with a subhyaline spot beneath the stigma. Abdomen closely punctured; the first segment with a deep lateral impression; the second, third, and fourth segments with a curved, deep, transverse depression; the ovipositor as long as the body.

Hab. Morty Island.

7. Pimpla diligens. *P.* flavo-ferruginea; antennis fuscis; capite strigisque duabus mesothoracis pallide testaceis; alis hyalinis.

Female. Length 6 lines. Reddish yellow; the antennæ fuscous, slightly reddish beneath; tips of the mandibles black; the head and two longitudinal stripes on the mesothorax pale testaceous; the wings hyaline and iridescent, the nervures black; the extreme base of the posterior tibiæ and the claws fuscous; the ovipositor black, half the length of the abdomen.

Hab. Morty Island.

8. Pimpla trifasciata. *P.* flava; antennis maculisque tribus mesothoracis nigris; abdomine tribus fasciis nigris; alis hyalinis, apice fuscis.

Female. Length 4½ lines. Yellow; the scape behind, a spot enclosing the ocelli, and the flagellum black. Thorax shining, punctured on the disk, and having three subquadrate spots between the tegulæ; wings hyaline, with a narrow fuscous border at their apex, the nervures black; the claw-joint of the posterior tarsi and the extreme base of the tibiæ fuscous. Abdomen with three fasciæ and the aculeus black, the latter half the length of the abdomen.

Hab. New Guinea.

9. Pimpla nigricornis. *P.* ferruginea; antennis nigris; alis flavo-hyalinis, apice fuscis.

Male. Length 9 lines. Ferruginous; the face and the scape of the antennæ yellow; the flagellum black; the thorax shining, the disk punctured; the mesothorax punctured; the antennæ black; the wings yellowish hyaline, the nervures dark fuscous; the anterior pair with a dark fuscous cloud at their apex. The abdomen finely punctured and shining.

Hab. New Guinea.

10. Pimpla interceptor. *P.* lutea; antennis strigisque tribus mesothoracis nigris; alis hyalinis, apice fuscis.

Female. Length 7 lines. Luteous; the face, and extreme base of the abdomen pale yellow; a triangular spot behind the vertex, a smaller spot enclosing the antennæ uniting with the former, the longitudinal stripes on the mesothorax, the central one running to the scutellum, and the ovipositor black; the scape yellow in front; the legs stout; the wings hyaline, the nervures black, the apex of the anterior wings fuscous; the thorax smooth and shining above. Abdomen reddish yellow towards the apex, punctured, and slightly shining.

Hab. New Guinea.

Gen. Rhyssa, *Grav.*

1. Rhyssa instigator. *R.* capite flavo, vertice nigro; thorace nigro, scabriusculo et flavo maculato; alis hyalinis, anticis fascia fusca ante apicem ornatis; abdomine nigro, segmentis primo et secundo dorso flavo maculatis, tertio, quarto et quinto maculis duabus flavis; tibiis tarsisque ferrugineis.

Female. Length 9 lines, of the ovipositor 13 lines. Head yellow, with the vertex, mandibles, and a minute spot on the front beneath the insertion of the antennæ black; antennæ wanting. Thorax black, rugose, with a transverse striation above; the collar, two stripes on the mesothorax, the scutellum and a spot on the middle of the metathorax, a larger spot on each side, an irregular spot beneath the wings, and a line on the sides of the coxæ yellow; the geniculations of the coxæ, trochanters, and femora, and the tibiæ and tarsi ferruginous; the claw-joint of the tarsi dark fuscous; the wings hyaline and iridescent, the anterior pair with a dark fuscous fascia crossing at the second submarginal cell. Abdomen black; a yellow spot in the middle of the first and second segments, the following segments with a yellow ovate spot on each side, each in succession becoming more oblong, the apical ones forming an oblong curved stripe; the margins of the segments beneath broadly yellow.

Hab. New Guinea.

Gen. Glypta, *Grav.*

1. Glypta fracticornis, *Smith, Proc. Linn. Soc.* vii. p. 10.

Hab. New Guinea.

Gen. Ophion, *Fabr.*

1. Ophion stimulator. *O.* rufescenti-flavus, antennis abdomineque apice nigris; alis hyalinis, iridescentibus.

Female. Length 10 lines. Bright reddish yellow; the antennæ black, the ocelli placed in a black patch on the vertex. The metathorax rugose, with a series of divergent carinæ running from the centre and passing down the sides; the wings hyaline and iridescent, the nervures black. The two first segments of the abdomen that form the petiole reddish yellow, the following black.

Hab. New Guinea.

Fam. BRACONIDÆ, *Westw.*

Gen. BRACON, *Fabr.*

1. BRACON PALLIFRONS, *Smith, Proc. Linn. Soc.* iii. p. 176.

Hab. Aru.

2. BRACON JACULATOR, *Smith, Proc. Linn. Soc.* v. p. 141.

Hab. Morty Island.

3. BRACON GRAVIDUS. *B.* rufescenti-flavus; capite luteo; alis brunneo-fuscis, macula hyalina sub stigmate.

Female. Length 7 lines. Head luteous, the tips of the mandibles and the antennæ black; covered with a fine pale pubescence. The thorax pubescent, the disk very smooth and shining; the wings dark brown, with a minute hyaline spot beneath the stigma, the extreme base of the wings pale; the posterior tarsi fuscous. Abdomen slightly fuscous towards the apex, the fourth and fifth segments with a slightly elevated tubercle in the middle of their basal margins; the ovipositor half the length of the abdomen.

Hab. New Guinea.

4. BRACON FERAX. *B.* niger; thorace pedibusque ferrugineis; tibiis tarsisque posticis fuscis; alis obscure fuscis.

Female. Length 4½ lines. Head and abdomen shining black, the antennæ opake black; the front below the insertion of the antennæ and the mandibles pale ferruginous; a black spot in the middle of the front. The thorax very smooth and shining; legs stout, and, as well as the thorax, ferruginous, with the posterior tibiæ, tarsi, and coxæ fuscous; wings dark fuscous. Abdomen with a white spot at the sides of the basal segment; ovipositor short, about half the length of the abdomen.

Hab. New Guinea.

5. BRACON FLAVICEPS. *B.* capite flavo, thorace pedibusque pallide ferrugineis; abdomine nitido, nigro; alis fuscis.

Female. Length 4½ lines. Head yellow, antennæ and eyes fuscous. Thorax and legs pale ferruginous, with the claws and pulvilli black; the mesothorax and scutellum very smooth and shining; wings fuscous, their extreme base pale ferruginous; three subhyaline spots beneath the stigma. Abdomen shining black, with a minute white spot on each side of the basal segment; the abdomen pale beneath, with a double row of black spots down the centre; the apical segment produced into an elevated spine; the ovipositor about the same length as the abdomen.

Hab. Salwatty.

Gen. AGATHIS, *Latr.*

1. AGATHIS ATROCEPHALUS, *Smith, Proc. Linn. Soc.* v. p. 142.
Hab. Morty Island.

2. AGATHIS INTERDICTA. *A.* ferruginea; antennis tarsisque posticis nigris; alis nigro-fuscis, macula hyalina sub stigmate.
Female. Length 5½ lines. Ferruginous; the flagellum black; the head, mesothorax, and abdomen smooth and shining; the wings dark fuscous, with an irregular hyaline spot beneath the stigma; the posterior tarsi and apex of the tibiæ black.
Hab. New Guinea.

3. AGATHIS FENESTRATA. *A.* flavo-ferruginea; capite, abdominis apice tarsisque posticis nigris; alis nigro-fuscis, macula hyalina sub stigmate.
Female. Length 5 lines. Reddish yellow; the head and antennæ black; the anterior margin of the clypeus, the labrum, and the mandibles pale reddish yellow. The wings dark fuscous, with an irregular hyaline spot beneath the stigma, the extreme base also pale; the posterior legs stout and pubescent, with the tarsi and tips of their femora black. The fourth and following segments of the abdomen black.
Hab. New Guinea.

Gen. CENOCŒLIUS, *Halid.*

1. CENOCŒLIUS INSIDIATOR, *Smith, Proc. Linn. Soc.* vii. p. 12.
Hab. New Guinea.

Gen. SPINARIA, *Brullé.*

1. SPINARIA SULCATA. *S.* rufo-flava; antennis tarsisque posticis nigris; alis fuscis, basi flavo-hyalinis.
Female. Length 4 lines. Reddish yellow; the antennæ, posterior tarsi, and extreme base of the tibiæ black; the wings dark fuscous, with their extreme base yellow hyaline; the nervures brown; the stigma large, with an irregular subhyaline spot beneath. The head and mesothorax shining; the metathorax with a short blunt spine on each side; the prothorax with the characteristic acute bent spine above. The abdomen longitudinally grooved or striated; the third and fourth segments armed laterally with a stout acute spine. (Pl. IV. fig. 9, ♀.)
Hab. Gilolo.

This species is quite distinct from the two described by Brullé in the 'Histoire Naturelle des Insectes,' and from that described by Guérin in the 'Voyage de la Coquille' under the name of *Bracon spinator*: our species most closely resembles the latter, but differs in having the wings entirely dark, in having the abdomen deeply striated, and in not having a spine in the middle of the margins of the third and fourth segments of the abdomen.

Fam. FORMICIDÆ, *Leach.*

Gen. Formica, *Linn.*

1. Formica gigas, *Latr. Hist. Nat. Fourm.* p. 105.
Hab. Sumatra.

2. Formica compressa, *Fabr. Syst. Piez.* p. 396.
Hab. Sumatra.

3. Formica festina, *Smith, Proc. Linn. Soc.* ii. p. 53.
Hab. Sumatra.

4. Formica rufifrons, *Smith, Proc. Linn. Soc.* v. p. 95.
Hab. Morty Island, New Guinea, Salwatty.

5. Formica camelina, *Smith, Proc. Linn. Soc.* ii. p. 57.
Hab. Sumatra.

6. Formica coxalis, *Smith, Proc. Linn. Soc.* iv. p. 136.
Hab. New Guinea.

7. Formica quadriceps, *Smith, Proc. Linn. Soc.* iv. p. 137.
Hab. New Guinea.

8. Formica (Myrmecopsis) respiciens. *F.* nigra, nitida; mandibulis, scapo, tibiis tarsisque pallide ferrugineis; prothorace abdomineque basi pallide flavis; oculis magnis.

Worker. Length 3 lines. Black and shining; the head oblong, sides nearly parallel; the eyes very large, ovate, extending to the posterior angles of the head; the anterior portion of the clypeus, the mandibles, scape, tibiæ, tarsi, and tips of the femora pale ferruginous. Thorax compressed behind; the prothorax above, the first segment of the abdomen and the basal margin of the second pale yellow; the scale of the peduncle oblong, slightly rounded above. (Pl. IV. fig. 3, ☿.)
Hab. New Guinea.

This remarkable Ant, of which a figure is given, will probably constitute the type of a new genus. The greatly enlarged eyes, placed backwards on the head, give it a different aspect from any species previously described. Unfortunately the only specimen received is in such a mutilated condition that I could not examine the parts of the mouth. Should an examination of more specimens prove my conjecture to be correct, I would propose the name *Myrmecopsis* for the genus.

Gen. Polyrhachis, *Smith.*

1. Polyrhachis sexspinosus, *Latr. Hist. Nat. Fourm.* p. 126.
Hab. New Guinea.

2. Polyrhachis Ithonus, *Smith, Proc. Linn. Soc.* v. p. 99.
Hab. Salwatty; Morty Island.

3. Polyrhachis bihamatus, *Drury, Ins.* ii. pl. 38.
Hab. New Guinea; Sumatra.

4. Polyrhachis Acantha, *Smith, Proc. Linn. Soc.* v. p. 98.
Hab. Salwatty; Morty Island.

5. Polyrhachis sericatus, *Guér. Voy. Coq. Zool.* ii. p. 203.
Hab. Salwatty.

6. Polyrhachis chalybeus, *Smith, Proc. Linn. Soc.* ii. p. 61.
Hab. Sumatra.

7. Polyrhachis Pandarus, *Smith, Proc. Linn. Soc.* ii. p. 62.
Hab. Sumatra.

8. Polyrhachis Eudora, *Smith, Proc. Linn. Soc.* v. p. 99.
Hab. Sumatra.

9. Polyrhachis villipes, *Smith, Proc. Linn. Soc.* ii. p. 61.
Hab. Sumatra.

10. Polyrhachis Bubastes, *Smith, Proc. Linn. Soc.* vii. p. 15.
Hab. Morty Island.

11. Polyrhachis bellicosus, *Smith, Proc. Linn. Soc.* iv. p. 142.
Hab. Morty Island.

12. Polyrhachis marginatus, *Smith, Proc. Linn. Soc.* iv. p. 139.
Hab. Gilolo.

13. Polyrhachis Dives, *Smith, Proc. Linn. Soc.* ii. p. 64.
Hab. Sula.

14. Polyrhachis Diaphantus, *Smith, Proc. Linn. Soc.* vi. p. 40.
Hab. Sula.

15. Polyrhachis rugifrons, *Smith, Proc. Linn. Soc.* v. p. 70.
Hab. Salwatty.

16. Polyrhachis Atropos, *Smith, Proc. Linn. Soc.* v. p. 100.
Hab. Gilolo.

17. Polyrhachis Neptunus. *P.* niger; thorace elongato, supra deplanato, dentibus duobus parvis antice et postice armato; abdominis pedunculo trispinoso.

Worker. Length $2\frac{1}{4}$ lines. Black; the apical joint of the flagellum and the claw-joint of the tarsi rufo-testaceous; tips of the mandibles ferruginous. The head anteriorly striated, posteriorly shagreened as far as the insertion of the antennæ; the extreme base of the scape ferruginous. Thorax flat above; transverse in front, with the lateral angles produced into short acute spines; the sutures of the pro- and mesothorax deeply impressed; the disk shagreened; the metathorax with two short erect spines. Abdomen globose, smooth and shining; the node of the peduncle incrassate, and armed above with three long, erect, acute spines. (Pl. IV. fig. 2, ☿.)

Hab. New Guinea.

Gen. ECHINOPLA, *Smith.*

1. ECHINOPLA MELANARCTOS, *Smith, Proc. Linn. Soc.* ii. p. 79.
Hab. Sumatra.

2. ECHINOPLA STRIATA, *Smith, Proc. Linn. Soc.* ii. p. 80.
Hab. Sumatra.

Gen. ŒCOPHYLLA, *Smith.*

1. ŒCOPHYLLA SMARAGDINA, *Smith, Proc. Linn. Soc.* v. p. 101.
Hab. Morty Island; Salwatty.

Fam. PONERIDÆ, *Smith.*

Gen. ODONTOMACHUS, *Latr.*

1. ODONTOMACHUS CEPHALOTES, *Smith, Proc. Linn. Soc.* vii. p. 19.
Hab. Morty Island; Sula.

2. ODONTOMACHUS NIGRICEPS, *Smith, Proc. Linn. Soc.* v. p. 103.
Hab. Dory.

3. ODONTOMACHUS ACICULATUS, *Smith, Proc. Linn. Soc.* vii. p. 19.
Hab. New Guinea.

Gen. PONERA, *Latr.*

1. PONERA STRIATA, *Smith, Proc. Linn. Soc.* v. p. 104.
Hab. Morty Island.

2. PONERA CUPREA, *Smith, Proc. Linn. Soc.* v. p. 104.
Hab. New Guinea; Sula.

3. PONERA SIMILLIMA, *Smith, Proc. Linn. Soc.* v. p. 104.
Hab. New Guinea.

4. PONERA 4-DENTATA, *Smith, Proc. Linn. Soc.* iv. p. 143.
Hab. Sula.

5. PONERA FEROX. *P.* nigra; capite elongato, aciculato; thorace abdomineque lævibus, nitidis; flagello tarsisque pallide ferrugineis.

Worker. Length 4¼ lines. Shining black; the head longitudinally aciculate; the prothorax with a few fine striæ anteriorly; the sides of the thorax with a few irregular striæ, otherwise smooth and shining; the node of the peduncle subquadrate and incrassate, and, as well as the abdomen, smooth and shining; the apical segment ferruginous. The mandibles, extreme base and apex of the scape, the flagellum, except the basal joint, and the tarsi and articulations of the legs ferruginous; the calcaria pale testaceous.
Hab. Salwatty.

This species is very like *P. simillima*; but it is a larger insect; and the thorax is smooth and shining, in *P. simillima* it is striated and opake.

Gen. PACHYCONDYLA, *Smith*.

1. PACHYCONDYLA MELANCHOLICA. *P.* nigra, opaca; antennis, mandibulis, tibiis tarsisque ferrugineis.

Worker. Length 3 lines. Opake black, the second and following segments of the abdomen finely shagreened; the head oblong; the eyes small, not prominent, and situated near the base of the mandibles; the sides curved, the vertex transverse; the sides of the thorax nearly parallel, the metathorax obliquely truncate; the node of the peduncle rounded anteriorly, truncate posteriorly, and filling the base of the first abdominal segment, but not quite so wide, rugose above. The mandibles, antennæ, tibiæ, tarsi, and knees ferruginous.

Hab. Morty Island.

This species belongs to the genus *Pachycondyla* of my Catalogue, the insects included in which have the body almost parallel, as well as the node of the peduncle, and the calcaria pectinate. Some continental authors have sunk this well-defined genus.

Gen. ECTATOMMA, *Smith*.

1. ECTATOMMA RUGOSA, *Smith, Proc. Linn. Soc.* iv. p. 143.

Hab. Sula.

Gen. ANOMMA, *Shuck*.

1. ANOMMA ERRATICA. *A.* nigro-ferruginea; capite antice et abdomine basi pallide ferrugineis; flagello pedibusque ferrugineis.

Worker. Length 2 lines. Obscurely ferruginous; the anterior portion of the head, the mandibles, apex of the scape, and the flagellum pale ferruginous; the scape black; the mandibles with a single tooth inside, their apex curved and very acute. Thorax compressed; the legs ferruginous, the tibiæ and tarsi palest; the legs elongate. Abdomen ovate, the node of the peduncle and the first segment paler than the following segments. The insect impunctate, very smooth and shining.

Hab. New Guinea.

This species is distinguished from the three species of the genus with which I am acquainted by the following particulars: the antennæ are proportionally longer, the scape black, and the legs considerably more elongate.

The discovery of this genus in the Eastern Archipelago is, geographically, a circumstance of considerable interest, all the species previously known being African. Several hymenopterists have adopted the supposed affinity between *Anomma* and *Dorylus*, regarding the former as worker or neuter forms of the latter. This affinity was first suggested by Dr. Savage, but I am not acquainted with a single circumstance even apparently confirmatory of such a supposition. The genus *Dorylus* is very abundant in

India, but I have not seen a single *Anomma* from that country. I am much more inclined to suspect an affinity with *Typhlopone*, which I have frequently observed with *Dorylus* in collections from India, and also from Borneo.

Fam. MYRMICIDÆ, *Smith.*

Gen. Myrmica, *Latr.*

1. Myrmica poneroides, *Smith, Proc. Linn. Soc.* v. p. 107.
Hab. Morty Island; Sula.

2. Myrmica quadrispinosa. *M.* nigro-fusca; thorace spinis duabus antice et postice armato.

Worker. Length 1 line. Dark brown-black, smooth and shining; the mandibles, antennæ, and tarsi pale ferruginous; a longitudinal carina runs from the insertion of each antenna halfway towards the posterior margin of the vertex; ocelli obsolete; eyes small, situated midway at the sides of the head; the head is of the same form as in *Myrmica rubra*; the club of the antennæ 3-jointed, the funiculus 8-jointed. Abdomen very finely striated longitudinally at the base; the peduncle subelongate, the first node conical, the second globose.

Hab. Salwatty. (Pl. IV. fig. 6, ☿.)

It will be seen from the above description that the insect has several characters in common with those of the genus *Myrmica*, in which I have placed it; but the discovery of the other sexes and an examination of the oral organs may render it necessary to separate it from the genus in which it is provisionally placed.

3. Myrmica maligna. *M.* rufo-nigra; clypeo, antennis pedibusque ferrugineis; capite et thorace dorso longitudinaliter striatis.

Female. Length 5 lines. Obscurely rufous, the head anteriorly and the antennæ bright ferruginous; the head longitudinally and strongly striated above, delicately so beneath. Thorax oblong-ovate; the mesothorax longitudinally striated above, with a smooth shining space down the middle and a narrower one on each side; the prothorax striated, as well as the sides of the metathorax, the latter with a delicate transverse striation above; the scutellum smooth and shining. Abdomen oblong-ovate, smooth and shining, with a few erect glittering white setæ at the apex; the nodes of the peduncle smooth and shining.

Hab. Morty Island.

This is probably the female of *M. aspersa.*

4. Myrmica aspersa. *M.* rufo-fulva; antennis apice pedibusque pallide ferrugineis; capite thoraceque scabrosis; metathorace bispinoso; abdomine ovato, petioli nodis sublævibus.

Worker. Length 2 lines. Varying in brightness of colouring, rufo-fulvous or dark ferruginous, with intermediate shade of colouring. Head and thorax very coarsely longitudinally rugose, the head deeply striated; mandibles smooth and pale ferruginous; the metathorax with two long, divergent, acute spines; the articulations of the legs and the tarsi pale ferruginous. The abdomen and nodes of the peduncle smooth and shining.

Hab. Morty Island.

5. MYRMICA DILIGENS. *M.* capite abdomineque nigris; antennis, mandibulis, thorace pedibusque pallide ferrugineis; metathorace spinis longis acutis armato.

Worker. Length 2 lines. Head black, smooth and shining, anteriorly obscurely ferruginous; a few abbreviated longitudinal striæ above the clypeus; the mandibles pale ferruginous; the antennæ ferruginous, palest towards their base. The thorax, legs, and first node of the abdomen pale ferruginous; the thorax coarsely rugose; the metathorax armed with two long acute spines, extending to the second node of the abdomen. Abdomen ovate, very smooth and shining.

Hab. New Guinea.

Gen. PODOMYRMA, *Smith.*

1. PODOMYRMA SYLVICOLA, *Smith, Proc. Linn. Soc.* v. p. 110.

Hab. Morty Island.

2. PODOMYRMA BASALIS, *Smith, Proc. Linn. Soc.* iv. p. 147.

Hab. New Guinea.

Gen. PSEUDOMYRMA, *Guér.*

1. PSEUDOMYRMA RUFONIGRA, *Jerdon, Madr. Journ. Lit. and Sci.* iii. p. 53.

Hab. Sumatra.

2. PSEUDOMYRMA CARBONARIA, *Smith, Proc. Linn. Soc.* vii. p. 20.

Hab. Morty Island.

Gen. MYRMICARIA, *Saund.*

1. MYRMICARIA (HEPTACONDYLUS) RUGOSUS, *Smith, Proc. Linn. Soc.* v. p. 110.

Hab. New Guinea.

I have received all the sexes of a species of *Myrmicaria* from Port Natal: the female constituted my own genus *Physatta*; the workers formed my genus *Heptacondylus*; both must now sink, and be included in Mr. Saunders's genus *Myrmicaria*, undoubtedly the male of *Physatta*. The male has the normal number of joints in the antennæ, namely thirteen, whilst the female, as well as the workers, have only seven.

Gen. CREMATOGASTER, *Lund.*

1. CREMATOGASTER POLITUS. *C.* capite, thorace abdomineque basi castaneo-rufis; pedibus pallide rufo-testaceis.

Worker. Length 1¼ line. Head, thorax, and base of the abdomen reddish chestnut; very smooth and shining. Head large, wider than the abdomen; eyes small and, as well as the tips of the mandibles, black. Thorax deeply strangulated between the meso- and metathorax, the latter armed with two short, stout, acute spines; the legs pale rufo-testaceous. The abdomen heart-shaped, black, with the base and nodes of the peduncle reddish chestnut.

Hab. New Guinea.

2. CREMATOGASTER IRIDIPENNIS. *C.* pallide castaneo-rufus, lævis nitidusque; alis hyalinis, iridescentibus.

Female. Length 2¼ lines. Pale chestnut-red, very smooth and highly polished. Head glassy smooth, the anterior part of a deeper red than the vertex; the ocelli situated in a darker stain; the mandibles with five black teeth. Thorax ovate, the metathorax without spines; the wings colourless and brilliantly iridescent; the legs paler than the thorax. Abdomen oblong-ovate, the margins of the segments deeply depressed; the basal margins of the segments pale.

Hab. New Guinea.

3. CREMATOGASTER TARSATUS. *C.* aterrimus, lævis et nitidus; antennis pedibusque rufo-piceis, tarsis albis.

Worker. Length 1¾ line. Shining black, impunctate; the anterior portion of the head and the mandibles obscurely ferruginous; the antennæ and legs rufo-piceous; the tarsi white; the anterior angles of the prothorax acute; the metathorax armed with two short, erect, acute spines. The abdomen rather wider than the head, its extreme apex pale testaceous.

Hab. Morty Island.

Fam. ATTIDÆ, *Smith.*

Gen. PHEIDOLE, *Westw.*

1. PHEIDOLE MEGACEPHALA, *Smith, Proc. Linn. Soc.* v. p. 112.

Hab. Sula.

2. PHEIDOLE HOSPES. *P.* rufo-ferruginea; capite maximo, in medio sulcato, longitudinaliter striato; antennis pedibusque pallide ferrugineis; abdomine nigro.

Worker (major). Length 2¼ lines. Head and thorax rufo-ferruginous; the head oblong-ovate, deeply notched behind, its anterior margin truncate; longitudinally striated, and having a longitudinal carina running from each antenna towards the vertex; the mandibles smooth and shining, their inner edge edentate; the antennæ and legs pale ferruginous; the metathorax with two minute sharp spines; the second node of the abdomen, as well as the abdomen itself, black.

Worker (*minor*). Length 1¼ line. The general colouring the same as in the worker major, but rather paler; and of a very different form: the head of the ordinary size, oblong-ovate, narrowed behind the eyes abruptly towards the prothorax, which forms a neck; the eyes are prominent, and situated midway at the side of the head (in the worker major they are about one-third from the anterior margin); the antennæ and legs elongate; the metathoracic spines very minute.

Hab. New Guinea.

Gen. PHEIDOLACANTHINUS, *Smith.*

Head large in the worker major; mandibles very stout, their inner edge sharp and smooth, not toothed; the antennæ 11-jointed, the club consisting of three joints; eyes minute, placed a little beyond the middle at the sides of the head. Thorax oblong, armed on each side in front with a long, stout spine, acute at its apex; the metathorax with two shorter spines. Abdomen ovate; the peduncle with two nodes.

The above characters are drawn from a unique example of a worker, and are necessarily incomplete, but, with the aid of a figure of the insect, will serve to discriminate the genus. It is very like a species of *Pheidole*, but has one joint less in the antennæ; and the armed prothorax indicates, I think, more than a specific distinction. The capture of the other sexes will, I expect, justify its separation as a genus.

1. PHEIDOLACANTHINUS ARMATUS. *P.* rufo-ferrugineus; capite maximo, in medio sulcato et striato; thorace spinis duabus acutis antice et postice armato.

Worker. Length 2 lines. Bright rufo-ferruginous; the abdomen very obscurely ferruginous, nearly black. Head very large, deeply striated longitudinally; the mandibles smooth and shining, their inner edge black and edentate. Thorax armed with two very stout, long spines in front, and two smaller ones on the metathorax; the femora incrassate in the middle; the tarsi slender and pale testaceous. Abdomen delicately aciculate at the extreme base; the first node of the peduncle compressed, the second incrassate and transverse. (Pl. IV. fig. 8, ☿.)

Hab. Salwatty.

Gen. SOLENOPSIS, *Westw.*

1. SOLENOPSIS LÆVIS. *S.* rufo-testacea, lævis, tota nitidissima, nuda; metathoracis spinis minutissimis.

Worker. Length 2¼ lines. Rufo-testaceous, smooth, shining, and impunctate; the inner margin of the mandibles with four black teeth; the head wider than the abdomen; the eyes very minute, situated midway at the sides of the head. Thorax rounded anteriorly; the metathorax with two minute spines. Abdomen ovate; the nodes oblong-ovate, the first pedunculate.

Hab. Morty Island.

Subfam. CRYPTOCERIDÆ, *Smith.*

Gen. CATAULACUS, *Smith.*

1. CATAULACUS SETOSUS, *Smith, Proc. Linn. Soc.* v. p. 114 & vii. p. 24.

Hab. Morty Island.

2. CATAULACUS HISPIDULUS. *C.* niger, hispidus; capite thorace et abdomine rugosis; thorace spinis duabus validis postice armato.

Worker. Length 2¾ lines. Black and subopake; thinly sprinkled with short erect white setæ; the head, thorax, legs, and nodes of the abdomen roughly sculptured, the face longitudinally so, the lateral posterior angles of the head with deep coarse punctures or fossulets which are more or less confluent; the sculpture of the thorax above and of the nodes of the abdomen is similar; the legs are coarsely roughened; the abdomen is much more finely sculptured and is somewhat longitudinally aciculate, the base is coarser than the disk. The anterior tibiæ and tarsi and the claw-joint of the intermediate and posterior pair ferruginous. The head transverse and widest behind, the sides being curved, the posterior angles acute. The thorax narrowed behind, transverse in front, the sides curved, terminating posteriorly in two short, broad, acute spines. Abdomen ovate. (Pl. IV. fig. 7, ☿.)

Hab. Sumatra.

Gen. CEPHALOXYS, *Smith.*

Head subtriangular in the ♀, deeply emarginate behind; eyes round, concealed beneath the grooves at the sides of the head; ocelli three, placed in a triangle on the vertex; the antennæ clavate, received into longitudinal grooves at the sides of the head above the eyes, the flagellum five-jointed; the mandibles subtriangular, multidentate. Thorax oblong-ovate, rounded anteriorly, posteriorly emarginate and bidentate; legs moderately long and stout, the anterior tibiæ armed with a stout spine at their apex, the intermediate and posterior pair unarmed. Abdomen ovate, the peduncle with two nodes.

The unique specimen from which the above characters are drawn is a female; unfortunately the wings are wanting. The insect somewhat resembles the *Ceratobasis singularis*, which I characterized in the first volume of the 'Journal of Entomology;' but from that remarkable genus it is separated by its six-jointed antennæ, besides other characters; it is one of the most remarkable insects with which I am acquainted, and it is the only species which I have seen that has the eyes situated beneath the head.

1. CEPHALOXYS CAPITATA. *C.* capite, thorace pedibusque ferrugineis, abdomine fusco-brunneo.

Female. Length 1½ line. Head, thorax, and legs ferruginous; the head heart-shaped; the mandibles porrect, continued in a line with the sides of the head, terminating in a point; the scape compressed; a black spot on the vertex, in which the ocelli are placed in a triangle. Thorax subovate, the metathorax with two short spines; the margins of the scutellum dusky; the head and thorax finely rugose and sprinkled with minute white scales or setæ. Abdomen smooth and shining, fuscous red or dark chestnut, with the base and apex pale; the nodes of the abdomen finely aciculate, and a few abbreviated striæ at the extreme base of the abdomen. (Pl. IV. fig. 5, ♀.)

Hab. New Guinea.

Fam. THYNNIDÆ, *Erichs.*

Gen. THYNNUS, *Fabr.*

1. THYNNUS LÆVISSIMUS. *T.* nigro-piceus, antennis pedibusque ferrugineis; abdominis segmento secundo striis quatuor transversis.

Female. Length 3 lines. Dark brown, nearly black, smooth and shining; the antennæ, mandibles, and legs ferruginous; the eyes lateral, touching the base of the mandibles. The mesothorax oblong-quadrate, slightly concave, with a central longitudinal carina; the metathorax obliquely truncate. Abdomen oblong, smooth and shining; the margins of the segments narrowly pale testaceous; the second segment with four deep transverse striæ; the apical segment ferruginous at the apex.

Hab. New Guinea.

2. THYNNUS ATRATUS. *T.* niger, capite thoraceque rude punctatis; abdomine utrinque maculis flavis, segmento secundo transversim striato. (*Fœm.*)

Female. Length 6¼ lines. Black; the mandibles ferruginous in the middle; the legs obscurely rufo-testaceous, brightest beneath, the anterior and intermediate tibiæ pale ferruginous beneath; a yellow spot on each side of the basal segment of a suboval form, pointed within; two smaller ovate yellow spots on the third segment, and also a minute yellow spot at the extreme lateral margins of the third and fourth segments. The scape of the antennæ very slender at the base, thickened and bent at the apex, and produced within into a sharp angle; the thorax transverse anteriorly, the margin slightly curved or emarginate; coarsely punctured above. The mandibles, legs, and the margins of the apical segments of the abdomen with long glittering pale hairs; the second segment of the abdomen with two ovate yellow spots beneath.

Hab. Gilolo.

The male of this species is described in the sixth volume of the 'Proceedings,' p. 21.

3. Thynnus (Agriomyia) abductor. *T.* niger, capite thoraceque flavo variegatis, abdominis segmentis maculis duabus transversis flavis, alis hyalinis.

Male. Length 6½ lines. Black; head and thorax very closely punctured, subopake; abdomen shining, with delicate punctures at the base of the segments, sparing towards their apical margins. The sides of the clypeus bordered with yellow, and a V-shaped yellow mark between the antennæ; the anterior and posterior margins of the prothorax, the tegulæ, an ovate spot on the scutellum, the postscutellum, and a narrow line running from it to the base of the posterior wings yellow; a yellow oblong and also an ovate spot beneath the wings, and another on each side of the metathorax situated posteriorly; all the tibiæ and tarsi and the intermediate and posterior femora ferruginous; the tibiæ, tarsi, and posterior femora more or less fuscous above; the wings hyaline, the nervures black. Abdomen, all the segments with a narrow line on each side near their apical margins; the lines sometimes obsolete on the sixth segment.

Hab. Salwatty and New Guinea.

This species closely resembles *T. vagans*, but is at once distinguished by narrow yellow lines, interrupted in the middle, on the apical margins of the segments, and the margins are also much more depressed.

Gen. ÆLURUS, *Klug.*

1. Ælurus fragilis. *Æ.* capite thoraceque nigris; abdomine, pedibus antennisque pallide ferrugineis.

Male. Length 4½ lines. Head and thorax black, and clothed with silvery pubescence, that on the face and clypeus very fine, dense, and glittering; the cheeks with a long fringe of silvery hairs; the mandibles and antennæ pale ferruginous; a yellow spot on the clypeus, and a minute one at the base of each antenna. The anterior margin of the thorax, the tegulæ, and the postscutellum yellow; the wings hyaline and iridescent, the nervures pale ferruginous. The legs and abdomen ferruginous.

Hab. Morty Island.

This elegant species somewhat resembles the *Æ. abdominalis* of Guérin, but its red antennæ and the silvery pubescence on the head and abdomen will at once distinguish it.

Gen. Enictus, *Shuck.*

1. **Enictus obscurus.** *E.* capite thoraceque nigris, nitidis; abdomine pedibusque obscure ferrugineis.

Male. Length 3 lines. Head and thorax shining black, thinly covered with a short silky white down; the antennæ rufo-testaceous; the mandibles long, curved, shining and testaceous at the apex, broadest at the base. Thorax, the profile subquadrate; the metathorax rounded behind; the legs obscurely ferruginous, with their geniculations and the tarsi pale testaceous. Abdomen oblong, obscurely ferruginous, finely and closely punctured, and thinly covered with pale down; the posterior margin of the apical segment rounded; the peduncle narrower than the following segment, concave above; beneath rufo-testaceous.

Hab. New Guinea.

This species is very distinct from *E. ambiguus*, the type of the genus, and which is in my possession; the following characteristics distinguish it: it is smaller, of a darker colour, and less pubescent; the abdomen is punctured, and the peduncle is not wider than the following segment.

Gen. Scleroderma, *Latr.*

1. **Scleroderma parasitica.** *S.* rufo-picea, lævis, nitida; abdomine cingulato.

Female. Length 2 lines. Rufo-piceous, smooth and shining; the anterior part of the head, the antennæ, and legs pale rufo-testaceous; the posterior margins of the segments of the abdomen dark rufo-piceous.

Hab. Salwatty.

Fam. MUTILLIDÆ, *Leach.*

Gen. Mutilla, *Linn.*

1. **Mutilla nigra,** *Smith, Proc. Linn. Soc.* iv. p. 151.

Hab. Salwatty.

2. **Mutilla mirabilis,** *Smith, Proc. Linn. Soc.* vii. p. 24.

Hab. New Guinea.

3. **Mutilla manifesta,** *Smith, Proc. Linn. Soc.* iv. p. 150.

Hab. New Guinea.

4. **Mutilla Merops,** *Smith, Proc. Linn. Soc.* v. p. 115.

Hab. Morty Island.

5. **Mutilla agilis.** *M.* capite thoraceque rude punctatis; antennis, mandibulis pedibusque ferrugineis; abdomine albo cingulato; alis subhyalinis, unifasciatis fuscis.

Male. Length 3¼ lines. Black; the antennæ, mandibles, and legs ferruginous, the coxæ black; the posterior tibiæ, except the base, rufo-fuscous; the metathorax with large coarse subconfluent punctures; the wings subhyaline, with a broad fuscous fascia crossing at the stigma. Abdomen shining, with a long thin black pubescence, most dense towards the apex; the second segment with a fascia or fringe of white pubescence.

Hab. New Guinea.

6. Mutilla fluctuata. *M.* nigra; capite thoraceque rude punctatis et pubescentibus; abdomine lævigato, nitido; alis subhyalinis; prothorace pube argentata vestito.

Male. Length 4 lines. Black; head and thorax coarsely punctured, the punctures on the metathorax very large and subconfluent; a deep longitudinal channel runs from each posterior stemma halfway towards the margin of the vertex; the head, sides of the thorax, and legs have a scattered, long, glittering silvery pubescence; the clypeus and prothorax are densely clothed with short silvery pubescence; the wings subhyaline, iridescent, and their apical margins clouded; the tegulæ smooth and shining, with their posterior half silvery; the tibiæ have their calcaria white. Abdomen smooth and shining, with scattered fine punctures, the posterior margins of the segments with long silvery hairs; the apical segment coarsely punctured and fringed with black hairs.

Hab. Morty Island.

Tribe *FOSSORES*, Latr.

Fam. SCOLIADÆ, *Leach*.

Gen. Tiphia, *Fabr*.

1. Tiphia flavipennis, *Smith, Proc. Linn. Soc.* ii. p. 91.
Hab. Gilolo; Morty Island.

Gen. Scolia, *Fabr*.

Div. 1. *The anterior wings with two submarginal cells and one recurrent nervure.*

1. Scolia fulgidipennis, *Smith, Proc. Linn. Soc.* iv. p. 152.
Hab. Salwatty.

2. Scolia nitida, *Smith, Proc. Linn. Soc.* iv. p. 152.
Hab. New Guinea.

3. Scolia quadriceps, *Smith, Proc. Linn. Soc.* iv. p. 153.
Hab. New Guinea.

4. Scolia captiva, *Smith, Proc. Linn. Soc.* vi. p. 52.
Hab. Sumatra.

Div. 2. *The anterior wings with two submarginal cells and three recurrent nervures.*

5. Scolia aureicollis, *St. Farg. Hym.* iii. p. 499.
Hab. Sula.

6. Scolia aurulenta, *Smith, Cat. Form.* p. 102.
Hab. Sula.

7. Scolia annulata, *Fabr. Syst. Piez.* p. 234.
Hab. Salwatty.

8. Scolia grossa, *Fabr. Syst. Piez.* p. 232.
Hab. Sumatra.

Div. 3. *The anterior wings with three submarginal cells and one recurrent nervure.*

9. Scolia morosa, *Smith, Proc. Linn. Soc.* v. p. 118.
Hab. Sula.

10. Scolia procera, *Fabr. Syst. Piez.* p. 241.
Hab. Sumatra.

11. Scolia dimidiata, *Guér. Voy. Coq. Zool.* ii. p. 247.
Hab. Sula; Sumatra.

12. Scolia cincta, *Smith, Proc. Linn. Soc.* ii. p. 89.
Hab. Sumatra.

Div. 4. *The anterior wings with three submarginal cells and two recurrent nervures.*

13. Scolia fulva, *Gray, Cuv. Anim. Kingd.* (*Griffiths*) p. 516. pl. 71. f. 1 ♀.
Hab. Morty Island.

14. Scolia arrogans. *S.* nigra, clypeo flavo, alis hyalinis; abdomine prismatico, flavo quinque-fasciato, secundo et tertio interruptis.

Male. Length 6 lines. Black; the clypeus yellow; the mandibles rufo-piceous at their apex. The prothorax before the wings, a spot beneath them, the scutellum, the postscutellum, and a broad stripe on each side of the metathorax yellow; the head, thorax, and legs thinly sprinkled with cinereous pubescence; the anterior tibiæ yellow in front; the wings hyaline, the superior pair fulvous at their anterior margin, the nervures rufo-testaceous. Abdomen, the first and four following segments margined with yellow, the first three broadly so, with the yellow fasciæ deeply emarginate in the middle, the second and third being slightly interrupted; entirely black beneath; the abdomen is pubescent, most densely so at the apex, where it is slightly fulvous; the apical segment trispinose, coarsely punctured at the base and shining.

Hab. Sumatra.

Fam. POMPILIDÆ, *Leach.*

Gen. Pompilus, *Fabr.*

1. Pompilus analis, *Fabr. Syst. Piez.* p. 219.
Hab. Morty Island.

2. Pompilus jucundus, *Smith, Proc. Linn. Soc.* vii. p. 29.
Hab. Morty Island.

3. Pompilus unifasciatus, *Smith, Cat. Foss. Hym.* p. 145.
Hab. Sumatra.

4. Pompilus cognatus. *P.* niger, facie utrinque ad marginem internum oculorum, prothoracis margine postico linea albida signato; tibiis posticis basi albis.

Male. Length 3½ lines. Black, covered with cinereous downy pile; the mandibles black at the base, white in the middle, and ferruginous at the apex; the palpi pale testaceous. The posterior margin of the prothorax bordered with white; the wings hyaline and iridescent, tips of the anterior pair fuscous; the base of the posterior tibiæ above and the calcaria white.

Hab. Morty Island.

5. Pompilus elatus. *P.* niger; pube argentato-alba variegata; alis fuscis.

Female. Length 5 lines. Black, smooth and shining; the face and cheeks clothed with silvery pubescence. The prothorax laterally, the posterior angles of the metathorax, a spot behind the wings, the coxæ, and the sides of the thorax adorned with bright, changeable, silvery pubescence; the posterior tibiæ and tarsi silvery; wings fuscous, the posterior pair palest. The abdomen adorned with silvery spots at the sides, which are more or less refulgent in different positions; beneath, the segments have lateral silvery spots.

Hab. Morty Island.

Gen. Priocnemis, *Schiödte.*

1. Priocnemis flavipennis, *Smith, Proc. Linn. Soc.* v. p. 79.
Hab. New Guinea.

2. Priocnemis pulcherrimus, *Smith, Proc. Linn. Soc.* iv. p. 156.
Hab. Salwatty.

3. Priocnemis fervidus, *Smith, Proc. Linn. Soc.* iii. p. 156.
Hab. New Guinea.

Gen. Agenia, *Schiödte.*

1. Agenia Amalthea, *Smith, Proc. Linn. Soc.* iii. p. 156.
Hab. Salwatty.

2. Agenia Numeria, *Smith, Proc. Linn. Soc.* vii. p. 31.
Hab. Morty Island.

3. Agenia Pandora. *A.* ferruginea, capite abdomineque apice nigris; alis anticis fascia transversa fusca.

Female. Length 5 lines. Head black and shining, the face and clypeus covered with silvery pile; the antennæ, anterior margin of the palpi, and mandibles ferruginous, the tips of the latter black; the antennæ slightly fuscous above. Thorax and legs ferruginous; the metathorax smooth and convex; the claw-joint of the tarsi fuscous; wings hyaline, the nervures pale ferruginous; the anterior wings with a fuscous fascia the width of the second and third submarginal cells, which it occupies, but does not quite cross the wing, terminating at the inferior margin of the third discoidal cell. Abdomen petiolated, the third and following segments black; the extreme apex ferruginous. The male differs in having the disk of the mesothorax black.

Hab. New Guinea.

Gen. Macromeris, *St. Farg.*

1. Macromeris violacea, *St. Farg. Hym.* iii. p. 464.
Hab. Sumatra.

2. Macromeris argentifrons, *Smith, Proc. Linn. Soc.* ii. p. 97.
Hab. Sumatra.

Gen. Mygnimia, *Smith.*

1. Mygnimia ferruginea, *Smith, Proc. Linn. Soc.* v. p. 121.
Hab. New Guinea.

2. Mygnimia fervida, *Smith, Proc. Linn. Soc.* v. p. 82.
Hab. New Guinea.

3. Mygnimia flava, *Fabr. Syst. Piez.* p. 197.
Hab. Sumatra.

4. Mygnimia ducalis, *Smith, Proc. Linn. Soc.* ii. p. 98.
Hab. Sumatra.

5. Mygnimia anthracina, *Smith, Cat. Foss. Hym.* p. 183.
Hab. Sumatra.

6. Mygnimia Lacæna, *Smith, Proc. Linn. Soc.* v. p. 121.
Hab. Sumatra.

Fam. SPHEGIDÆ, *Leach.*

Gen. Sphex, *Fabr.*

1. Sphex nigripes, *Smith, Cat. Foss. Hym.* p. 254.
Hab. Sumatra.

2. Sphex sericea, *Fabr. Syst. Piez.* p. 211.
Hab. Sumatra.

3. Sphex argentata, *Dahlb. Hym. Europ.* i. p. 25.
Hab. New Guinea; Morty Island.

4. Sphex diabolica, *Smith, Proc. Linn. Soc.* ii. p. 100.
Hab. New Guinea.

5. Sphex ferruginea, *St. Farg. Hym.* iii. p. 348.
Hab. Salwatty.

6. **Sphex tyrannica**, *Smith, Proc. Linn. Soc.* v. p. 122.
Hab. Sumatra; Sula.

Gen. Ampulex, *Jurine.*

1. **Ampulex smaragdina**, *Smith, Proc. Linn. Soc.* ii. p. 99.
Hab. Sumatra.

Gen. Pelopœus, *Latr.*

1. **Pelopœus murarius**, *Smith, Proc. Linn. Soc.* vii. p. 34 (♂?).
Hab. New Guinea.

Fam. LARRIDÆ, *Leach.*

Gen. Larrada, *Smith.*

1. **Larrada modesta**, *Smith, Proc. Linn. Soc.* iii. p. 159.
Hab. Salwatty.

2. **Larrada mansueta.** *L.* nigerrima; capite abdomineque nitidis; thorace opaco; scapo, tibiis tarsisque ferrugineis; alis hyalinis, anticis fascia fusca.

Female. Length 7 lines. Black; the head shining and closely punctured; the clypeus covered with silvery pile; the scape, apex of the joints of the antennæ, the anterior margin of the clypeus, and the mandibles ferruginous; the palpi pale testaceous. Thorax opake; the metathorax finely rugose, and clothed with silvery pile at the apex; the sides, beneath, the coxæ, and femora with a thin changeable silvery pile; the articulations of the coxæ, trochanters, and femora, the tibiæ and tarsi ferruginous; the posterior femora dusky above; wings hyaline, the anterior pair with a broad fuscous fascia. Abdomen smooth and shining, longer than the head and thorax; the extreme lateral margins of the segments ornamented with spots of changeable silvery pile.

Hab. New Guinea.

3. **Larrada mendax.** *L.* nigerrima; mandibulis pedibusque ferrugineis; metathorace rugoso; alis subhyalinis.

Female. Length 5 lines. Black; mandibles and legs ferruginous, with the coxæ black. The head, thorax, and abdomen thinly covered with a short grey silky pubescence; the clypeus covered with silvery pile, as well as the lower part of the cheeks. The thorax closely punctured above; the metathorax rugose, having a few coarse radiating grooves at the base, and an abbreviated carina in the centre; the wings subhyaline, the apex of the anterior pair slightly fuscous; the intermediate and posterior tarsi fuscous above, with the tips of the joints ferruginous. The abdomen smooth and shining.

Hab. Gilolo.

Gen. LARRA, *Fabr.*

1. LARRA PRISMATICA, *Smith, Proc. Linn. Soc.* ii. p. 103.
Hab. New Guinea; Morty Island.

2. LARRA SUADA. *L.* nigra, nitida; facie, pro- et metathorace abdominisque segmentorum fasciis argenteo sericeis; alis hyalinis.

Male. Length 3 lines. Head shining, the face and cheeks covered with silvery pubescence, the mandibles ferruginous, the palpi pale testaceous. Thorax, the disk finely and closely punctured; the pro- and metathorax covered with silvery pubescence; the legs with a fine silky silvery pile; the wings hyaline and iridescent, the nervures testaceous. Abdomen smooth and shining, the apical margins of the segments with silvery fasciæ.

Hab. Gilolo.

Gen. PISON, *Spin.*

1. PISON PALLIDIPALPIS, *Smith, Proc. Linn. Soc.* vii. p. 35.
Hab. Morty Island.

2. PISON MOROSUS. *P.* niger, nitidus, distincte punctatus; alis subhyalinis, venis nigris; abdomine nitido, segmentorum marginibus argentatis.

Female. Length 4 lines. Head punctured, the punctures confluent on the face; the clypeus and the face along the inner margin of the eyes with silvery pile; the tips of the mandibles ferruginous. The thorax closely and strongly punctured, the tegulæ smooth and shining; the wings subhyaline and iridescent; the sides of the thorax with a thin cinereous pubescence; the legs with a glittering pile. Abdomen shining and finely punctured; the margins of the segments depressed; the apical margins with fasciæ of silvery pile, only visible in certain positions.

Hab. New Guinea.

This species closely resembles *Pison pallidipalpis*, from Ceram; but it may be at once distinguished by the absence of the central longitudinal channel of the metathorax.

Fam. BEMBICIDÆ, *Westw.*

Gen. BEMBEX, *Latr.*

1. BEMBEX MELANCHOLICA, *Smith, Cat. Foss. Hym.* p. 328.
Hab. Salwatty; Morty Island.

Fam. CRABRONIDÆ, *Leach.*

Gen. TRYPOXYLON, *Latr.*

1. TRYPOXYLON PROVIDUM, *Smith, Proc. Linn. Soc.* v. p. 125.
Hab. New Guinea.

2. TRYPOXYLON GRACILLIMUM, *Smith, Proc. Linn. Soc.* vii. p. 35.
Hab. Morty Island.

Gen. CRABRO, *Fabr.*

1. CRABRO (RHOPALUM) LIGNARIUS. *C.* niger; abdomine petiolato, segmentis secundo tertio quartoque bimaculato flavis; scapo, collari, tuberculis, scutelloque maculis duabus flavis; tibiis tarsisque ferrugineis.

Female. Length $4\frac{1}{2}$ lines. Opake black; the head large, wider than the thorax, and subquadrate; the ocelli in a curve on the vertex; the scape and a stripe on the mandibles yellow; the clypeus densely covered with silvery pile; the cheeks have a thin silvery pubescence. Thorax: an interrupted line on the collar, the tubercles, and two spots on the scutellum yellow; the sides of the thorax with hoary pubescence; wings subhyaline and iridescent; the apex of the tibiæ and the tarsi ferruginous, the claw-joint rufo-piceous. Abdomen: petiole black, the first segment with an ovate spot on each side, the two following segments with an oblong-ovate spot on each side; beneath immaculate.

Hab. Morty Island.

Very closely allied to the *Megapodium Westermanni* of Dahlbom.

2. CRABRO BUCEPHALUS. *C.* niger; capite magno, ocellis triangulariter ordinatis in vertice; metathorace dorso longitudinaliter striato.

Female. Length 3 lines. Black: head large, wider than the thorax, subquadrate, smooth and shining; the ocelli in a triangle in the centre of the vertex; the clypeus and cheeks with a silvery pubescence; the scape yellow in front; the mandibles ferruginous at their apex; the clypeus produced in the middle into a blunt tooth. An interrupted line on the collar, the tubercles, two ovate spots on the scutellum, the postscutellum, the base of the tibiæ above, and the basal joint of the tarsi pale yellow; the tarsi reddish brown; the calcaria pale; a smooth enclosed space at the base of the metathorax, which is divided in the middle by a longitudinal channel which runs to the apex of the metathorax; the wings subhyaline and iridescent, the tegulæ rufo-testaceous. The abdomen smooth and shining, with the apical segments slightly pubescent.

Hab. Morty Island.

Gen. MIMESA, *Shuck.*

1. MIMESA CARBONARIA. *M.* atra, leviter griseo pubescens; facie argenteo pubescente; metathorace rugoso.

Male. Length $4\frac{1}{4}$ lines. Black and shining, the disk of the thorax and the abdomen with a chalybeous reflexion; thinly sprinkled with grey pubescence, which is most dense and long on the metathorax; the face covered with silvery pile; the antennæ fulvous beneath, the scape black; the palpi and mandibles yellow, the tips of the latter ferruginous. Thorax: the metathorax coarsely rugose; the wings

clear hyaline and iridescent, the tegulæ pale testaceous; the legs ferruginous; the posterior coxæ black at their base; the femora and tibiæ with a darkish stain beneath, and the claw-joint of the tarsi dark. Abdomen: the petiole linear; the apex piceous and punctured.
Hab. Morty Island.

This I believe to be the first species of the genus that has been found within the tropics.

Fam. PHILANTHIDÆ, *Dahlb.*

Gen. Cerceris, *Latr.*

1. Cerceris sepulchralis, *Smith, Proc. Linn. Soc.* ii. p. 107.
Hab. Sumatra.

2. Cerceris tumulorum. *C.* nigra, flavo variegata; clypeo bidentato; abdomine fasciis tribus flavis; pedibus flavo-ferrugineis; alis fulvo-hyalinis, marginibus anterioribus fuscis.

Female. Length 6 lines. Black, shining, and punctured, the head and thorax more closely and strongly so than the abdomen; the mandibles, face, clypeus, two minute spots on the vertex and a larger spot behind the eyes near their summit, yellow; the clypeus with two minute teeth; the tips of the mandibles rufo-piceous; the scape in front and the flagellum beneath fulvous. Thorax: two spots on the collar, two on the scutellum, the postscutellum, and the tegulæ yellow; the legs reddish yellow, with the coxæ, and the posterior tarsi towards their apex, dark fuscous; wings fulvo-hyaline, with a dark fuscous stain at the anterior margin of the superior pair. Abdomen: a spot on the basal segment, and a subinterrupted band on the apical margins of the three following segments, the bands narrowest in the middle.
Hab. Gilolo.

Group *SOLITARY WASPS.*

Fam. EUMENIDÆ, *Westw.*

Gen. Eumenes, *Fabr.*

1. Eumenes arcuatus, *Fabr. Syst. Piez.* p. 286.
Hab. Salwatty.

2. Eumenes Praslina, *Guér. Voy. Coq. Zool.* ii. p. 267 (var. *arcuatus*).
Hab. Morty Island.

3. Eumenes eximius, *Smith, Proc. Linn. Soc.* v. p. 126.
Hab. New Guinea; Morty Island.

4. Eumenes volatilis, *Smith, Proc. Linn. Soc.* vii. p. 38.
Hab. New Guinea.

5. Eumenes fulvipennis, *Smith, Cat. Vespidæ,* p. 24.
Hab. Sula.

6. **Eumenes circinalis**, *Fabr. Syst. Piez.* p. 286.
Hab. Morty Island.

7. **Eumenes insolens.** *E.* capite thoraceque flavo variegatis; abdominis petiolo elongato, medio utrinque dentato, segmento primo postico anguste flavo; alis infuscatis.

Female. Length 6 lines. Black: head and thorax opake, strongly and closely punctured; the clypeus united to a spot above; the inner margin of the eyes and a narrow line behind them yellow. The anterior margin of the prothorax, a line beneath the wings, running down to the intermediate coxæ, the anterior legs, the intermediate tibiæ and tarsi, the posterior tibiæ and the knees yellow; the postscutellum and a large macula on each side of the metathorax yellow. The abdomen smooth and shining, the first segment with a narrow marginal fascia.

Hab. Gilolo.

Gen. Odynerus, *Latr.*

1. **Odynerus multipictus**, *Smith, Proc. Linn. Soc.* ii. p. 112.
Hab. New Guinea.

2. **Odynerus laboriosus**, *Smith, Proc. Linn. Soc.* vii. p. 41.
Hab. New Guinea.

3. **Odynerus conspicuus**, *Smith, Proc. Linn. Soc.* vii. p. 40.
Hab. Salwatty.

4. **Odynerus impulsus.** *O.* capite thoraceque rude punctatis et flavo variegatis; abdominis segmentis flavo fasciatis, segmento secundo bimaculato.

Female. Length 5 lines. Black; the head and thorax strongly and closely punctured. The clypeus emarginate in front, the angles produced into sharp teeth; a line on the mandibles, another at the inner margin of the eyes, terminating in their emargination, and a line behind the eyes yellow. Thorax: two angular spots on the prothorax, two on the scutellum, two angular spots on the posterior margin of the metathorax and a line passing outwardly from each, the tegulæ, tubercles, and a spot on the anterior and intermediate coxæ yellow; the wings subhyaline, the nervures black, a testaceous spot on the tegulæ; the legs ferruginous, with the posterior tarsi dusky. Abdomen very finely punctured and slightly shining; the margins of the segments bordered with yellow, the second segment with two yellow spots above and beneath.

Hab. Morty Island.

The specimen described has the heads of two females of a species of *Stylops* protruding from beneath the third segment.

Gen. Rhynchium, *Spin.*

1. **Rhynchium hæmorrhoidale**, *Fabr. Syst. Piez.* p. 259.
Hab. New Guinea.

2. RHYNCHIUM RUBROPICTUM, *Smith, Proc. Linn. Soc.* v. p. 128.
Hab. Morty Island.

3. RHYNCHIUM METALLICUM, *Sauss. Mon. Guêpes Sol.* p. 114.
Hab. Morty Island.

Gen. PTEROCHILUS, *Klug.*

1. PTEROCHILUS EXIMIUS. *P.* niger, capite thoraceque flavo variegatis; abdominis segmentis flavo marginatis, segmento secundo flavo binotato.

Male. Length 10½ lines. Opake black, with the disk of the thorax slightly shining. The clypeus, and a spot above it, between the antennæ and the scape in front, yellow. A semicircular spot on each side of the prothorax, an ovate spot beneath the wings, and two subovate spots on the scutellum yellow; the wings fulvo-hyaline, with a fusco-ferruginous stain at the anterior margin of the superior pair, not passing beyond the stigma; the nervures ferruginous; the tibiæ, tarsi, and knees yellow, with a dark stain on the tibiæ behind. Abdomen, the margins of all the segments bordered with yellow, that on the basal segment recurved at the sides. (Pl. IV. fig. 4, ♂.)
Hab. New Guinea.

All the species of this genus are rare. The present, of which only a single specimen was captured, is one of the finest hitherto discovered.

Group *SOCIAL WASPS.*

Gen. ISCHNOGASTER, *Guér.*

1. ISCHNOGASTER UNICOLOR, *Smith, Proc. Linn. Soc.* vii. p. 41.
Hab. New Guinea.

2. ISCHNOGASTER IRIDIPENNIS, *Smith, Proc. Linn. Soc.* iii. p. 166.
Hab. New Guinea; Sula.

Gen. VESPA, *Linn.*

1. VESPA AFFINIS, *Fabr. Syst. Piez.* p. 254 (var. *V. cincta*).
Hab. Sula; New Guinea; Morty Island.

2. VESPA BELLICOSA, *Sauss. Mon. Guêpes Soc.* p. 146.
Hab. Sumatra.

3. VESPA DORYLLOIDES, *Sauss. Mon. Guêpes Soc.* p. 112.
Hab. Sumatra.

Gen. POLISTES, *Latr.*

1. POLISTES SIMULATUS, *Smith, Proc. Linn. Soc.* v. p. 130.
Hab. New Guinea; Morty Island.

2. POLISTES NIGRIFRONS, *Smith, Proc. Linn. Soc.* iii. p. 168.
Hab. Salwatty.

3. Polistes diabolicus, *Sauss. Mon. Guêpes Soc.* p. 68.
Hab. New Guinea.

4. Polistes sagittarius, *Sauss. Mon. Guêpes Soc.* p. 56.
Hab. Sumatra.

5. Polistes stigma, *Fabr. Syst. Piez.* p. 261.
Hab. Sumatra.

6. Polistes tepidus, *Fabr. Syst. Piez.* p. 271.
Hab. Gilolo; Morty Island.

7. Polistes multipictus, *Smith, Proc. Linn. Soc.* v. p. 130.
Hab. Gilolo; Morty Island.

Gen. Icaria, *Sauss.*

1. Icaria maculiventris, *Sauss. Mon. Guêpes Soc.* p. 23.
Hab. Salwatty.

2. Icaria irritata, *Smith, Proc. Linn. Soc.* vii. p. 42.
Hab. New Guinea.

3. Icaria nigra, *Smith, Proc, Linn. Soc.* iii. p. 167.
Hab. New Guinea.

4. Icaria gracilis, *Smith, Proc. Linn. Soc.* iv. p. 167.
Hab. New Guinea.

5. Icaria conservator, *Smith, Proc. Linn. Soc.* v. p. 130.
Hab. Salwatty.

6. Icaria festina. *I.* opaca, nigra; clypeo maculato, oculis intus, scutello, metathorace abdominisque marginibus segmentorum anguste flavis; alis hyalinis.

Female. Length 3¾ lines. Opake black, covered with a thin silky pile; the antennæ fulvous beneath; the mandibles ferruginous; a line on the inner margin of the eyes, two spots on the clypeus, and a line on the cheeks yellow. The posterior margin of the prothorax, a spot beneath the wings, the scutellum, and metathorax behind, yellow; the tarsi and the tibiæ beneath ferruginous; the wings hyaline and iridescent, the nervures black; the anterior margin of the superior pair towards their apex fuscous. Abdomen, the margins of the segments narrowly bordered with yellow.

Hab. New Guinea.

7. Icaria bicolor. *I.* opaca, nigra, pube sericea vestita; clypei margine antico, mandibulis, antennis, pedibus, metathorace abdominisque petiolo ferrugineis; alis saturate fulvis.

Female. Length 5½ lines. Opake black, thinly covered with a silky pile; the anterior margin of the clypeus, the mandibles, antennæ, legs, metathorax, and the petiole of the abdomen ferruginous; the anterior margin of the clypeus angular, produced in the middle into a sharp point or tooth; the wings fulvous, the tegulæ fulvous. The apical margins of the second and three following segments of the abdomen ferruginous, the terminal segment entirely so.

Hab. New Guinea.

Fam. ANDRENIDÆ, *Leach.*

Gen. Prosopis, *Fabr.*

1. Prosopis elegans. *P.* capite thoraceque viridibus, flavo pulchre pictis; abdomine purpureo, splendide micante; pedibus ferrugineis; alis hyalinis, iridescentibus.

Female. Length $3\frac{3}{4}$ lines. Head and thorax green, not shining, very closely punctured; the enclosed triangular space at the base of the metathorax very delicately punctured; the front with a central yellow line, extending from the anterior stemma to the anterior margin of the clypeus, and a similar stripe on each side, close to the inner orbit of the eyes; a narrow yellow line behind the eyes; the labrum yellow; the tips of the mandibles ferruginous; the antennæ fulvous beneath. Thorax: the collar, a line passing over the tegulæ and the sides of the scutellum, a spot in the middle of the postscutellum, the tegulæ, and a spot behind them yellow; the tips of the anterior femora, the intermediate and posterior pairs, and all the tibiæ and tarsi ferruginous, the latter more or less fuscous above; the base of the posterior tibiæ whitish; wings hyaline and splendidly iridescent, the nervures testaceous, with the costal black. Abdomen purple, splendidly iridescent, changing in different lights; the posterior margins of the first, second, and third segments with a little white pubescence at the sides of the abdomen.

Hab. New Guinea.

Gen. Nomia, *Latr.*

1. Nomia dentata, *Smith, Proc. Linn. Soc.* iv. p. 133.

Hab. New Guinea.

2. Nomia clavata, *Smith, Proc. Linn. Soc.* vi. p. 29.

Hab. Morty Island.

3. Nomia opulenta. *N.* nigra; capite thoraceque punctatis, opacis; abdomine nitido, segmentis ad marginem apicalem cæruleo-viridibus pulchriter ornatis.

Male. Length 4 lines. Black: the face, sides of the thorax and beneath, the metathorax and legs with a cinereous pubescence; the collar and postscutellum with dense short white pubescence; the antennæ slightly fulvous beneath; the wings subhyaline, their apical margins clouded, the nervures testaceous, the tegulæ pale testaceous; the legs rufo-testaceous. Abdomen smooth, shining, finely and closely punctured; the apical margins of the segments with fasciæ of very bright blue-green, changing in different lights; beneath rufo-testaceous.

Hab. Morty Island.

This insect so closely resembles the *N. concinna* from Celebes and Ceram, that I suspect it may be the true male of that species; that which I have described as being so is probably a distinct species.

Fam. MELECTIDÆ, *Westw.*

Gen. CROCISA, *Latr.*

1. CROCISA NITIDULA, *Fabr. Syst. Piez.* p. 386.
Hab. Salwatty; Gilolo.

Gen. CŒLIOXYS, *Latr.*

1. CŒLIOXYS INTRUDENS, *Smith, Proc. Linn. Soc.* v. p. 132 (♂?).
Hab. Morty Island.

Fam. DASYGASTRÆ, *Latr.*

Gen. MEGACHILE, *Latr.*

1. MEGACHILE LACHESIS, *Smith, Proc. Linn. Soc.* v. p. 133.
Hab. Salwatty.

2. MEGACHILE CLOTHO, *Smith, Proc. Linn. Soc.* v. p. 134.
Hab. Morty Island.

3. MEGACHILE ALECTO, *Smith, Proc. Linn. Soc.* v. p. 134.
Hab. Morty Island.

4. MEGACHILE NIDULATOR. *M.* nigra; abdominis basi pube alba, apice ferruginea vestito; alis fuscis.

Female. Length 6 lines. Black, and clothed with black pubescence, which is short and very sparing; the disk of the thorax shining and punctured; wings dark fuscous; the base of the abdomen and margin of the scutellum fringed with white pubescence; the apical margin of the third segment of the abdomen and the three following segments covered with short red pubescence; all the segments clothed beneath with pubescence of the same colour.

Hab. New Guinea.

5. MEGACHILE SENEX. *M.* nigra; capite pube alba vestito; abdominis segmentis apicalibus fulvis; alis fulvo-hyalinis.

Female. Length 8 lines. Black; the head densely clothed with short white pubescence, the pubescence on the thorax and abdomen short and black; the sixth segment of the latter red, and covered with short fulvous pubescence; the basal joint of the posterior tarsi fulvous within, the tibiæ with an ashy pubescence within; the wings fulvo-hyaline, the nervures black.

Hab. New Guinea.

6. Megachile apicata. *M.* nigra, opaca, facie pube pallide flava vestita; alis infuscatis; abdomine segmentis duobus apicalibus ferrugineis tomentosis.

Male. Length 4 lines. Black, opake, clothed with a dense short pubescence; the face covered with pale yellow pubescence, as well as the lower portion of the cheeks. The wings fuscous, palest at their base; the anterior and intermediate tarsi ferruginous, the latter fuscous above; the anterior coxæ armed with short acute teeth. Abdomen: beneath, the apical margins of the segments rufo-testaceous; the two apical segments clothed with pale ferruginous pubescence.

Hab. Morty Island.

Fam. SCOPULIPEDES.

Gen. Ceratina, *Latr.*

1. Ceratina hieroglyphica, *Smith, Cat. Apidæ*, p. 224.
Hab. Gilolo.

Gen. Xylocopa, *Latr.*

1. Xylocopa latipes, *Drury, Ill. Exot. Ins.* ii. p. 98.
Hab. Sumatra.

2. Xylocopa cærulea, *Fabr. Syst. Piez.* p. 345.
Hab. Sumatra.

3. Xylocopa Dejeanii, *St. Farg. Hym.* ii. p. 209.
Hab. Sumatra.

4. Xylocopa provida, *Smith, Proc. Linn. Soc.* vii. p. 48.
Hab. Morty Island.

5. Xylocopa nobilis, *Smith, Proc. Linn. Soc.* iii. p. 8.
Hab. Sula.

6. Xylocopa coronata, *Smith, Proc. Linn. Soc.* v. p. 135.
Hab. Morty Island.

Gen. Anthophora, *Latr.*

1. Anthophora zonata, *Linn. Syst. Nat.* i. p. 995.
Hab. Salwatty; New Guinea.

Gen. Trigona, *Jurine.*

1. Trigona læviceps, *Smith, Proc. Linn. Soc.* ii. 51, iii. 135.
Hab. New Guinea.

2. Trigona planifrons. *T.* nigra, nitida; pectore abdomineque subtus pube cinerea tectis; alis subhyalinis, nervuris atris.

Worker. Length 2½ lines. Shining black; the flagellum beneath obscurely fulvous; the apex of the mandibles rufo-piceous. Thorax beneath thinly clothed with cinereous pile or short pubescence; the wings subhyaline, the nervures black; the posterior tibiæ broadly expanded towards their apex, and fringed outwardly with black pubescence. Abdomen conical, and thinly clothed beneath with cinereous pubescence.

Hab. New Guinea.

3. TRIGONA ATRICORNIS. *T.* melleo-flava; flagello, tibiis tarsisque intermediis et posticis nigris.

Worker. Length 2 lines. Honey-yellow, smooth and shining; the inner edge of the mandibles rufo-piceous; the flagellum black, slightly fulvous beneath. Thorax: a glassy-smooth and shining pale space enclosed by a suture; the wings hyaline and iridescent, the nervures dark fusco-ferruginous; the intermediate and posterior tarsi, the posterior tibiæ outside, except at their base, and a line on the posterior femora above black. The two apical segments of the abdomen thinly covered with white downy pile; beneath, the segments fringed with pale hairs.

Hab. New Guinea.

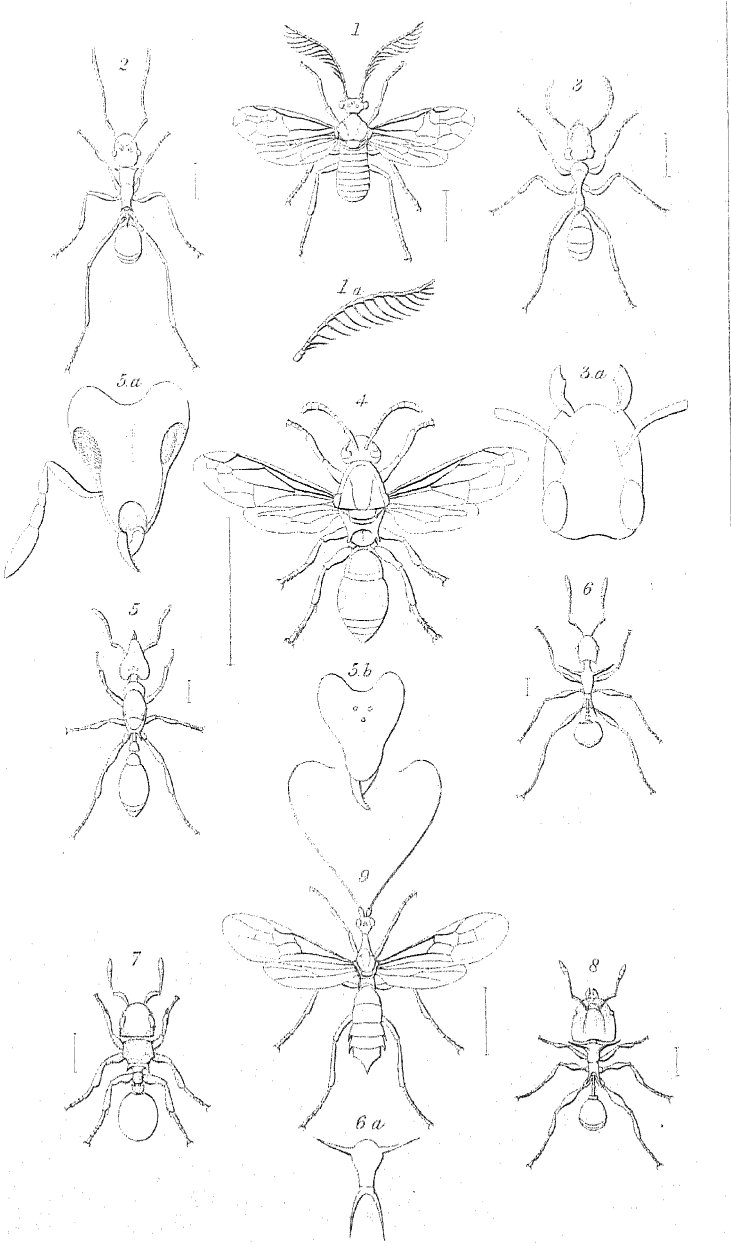
DESCRIPTION OF PLATE IV.

Fig. 1. Cladomacra macropus, ♂. 1 *a*. Antenna of ditto.
Fig. 2. Polyrhachis Neptunus, ☿.
Fig. 3. Formica (Myrmecopsis) respiciens, ☿. 3 *a*. Head of ditto.
Fig. 4. Pterochilus eximius, ♂.
Fig. 5. Cephaloxys capitata, ♀.
Fig. 5 *a*. Under side of the head of ditto.
Fig. 5 *b*. Upper side of the head of ditto.
Fig. 6. Myrmica quadrispinosa, ☿.
Fig. 6 *a*. Thorax of ditto.
Fig. 7. Cataulacus hispidulus, ☿.
Fig. 8. Pheidolacanthinus armatus, ☿.
Fig. 9. Spinaria sulcata, ♀.

Account of a Heronry, and Breeding-place of other Water-birds, in Southern India. By JOHN SHORTT, M.D., F.L.S.

[Read Nov. 3, 1864.]

IN the Madras district, about fifty miles from Madras and twelve miles from Chingleput in a south-easterly direction, is a small village called Vaden Thaugul, which means literally "Hunter's Rest," from *vaden*, "hunter," and *thaugul*, "rest." To the south of the village lies one of those small tanks called *Thaugul* by the Tamil ryots, implying a water-rest or temporary reservoir, from which



F. Smith Del.t & Sculp.t

the village derives its name; but why *Vaden* was added to it is not known. It is possible that, from its being the resort of numbers of birds, the people connected it with the term *vaden*, or "hunter," a name given to a rude class of people in Southern India who are known as hunters and birdcatchers, but who have never been found residing here. The Vaden Thaugul tank is situated N.N.W. of the Carangooly Fort, and is 3½ miles distant in a direct line from the Great Southern Trunk road.

The bund, whose greatest height is 12 feet, commences from a piece of high ground near the village, runs for a distance of about 600 yards in a south-easterly direction, then takes a sharp turn almost at a right angle, and terminates in high ground about 200 yards further. The water-spread is limited on the north-east by slightly rising ground overgrown with low jungle, and on the east-south-east by high gravelly and rocky ground. The area comprised in the tank is about four acres and a half (thirty cawnies *).

From the north-east to the centre of the bed of the tank there are some 500 or 600 trees of the *Barringtonia racemosa*, from about 10 to 15 feet in height, with circular, regular, moderate-sized crowns; and when the tank fills, which it does during the monsoons, the tops only of the trees are just visible above the level of the water.

This place forms the breeding-resort of an immense number of water-fowl; Herons, Storks, Cranes, Ibises, Water-crows or Cormorants, Darters and Paddy-birds, &c., make it their rendezvous on these occasions.

From about the middle of October to the middle of November small flocks of twenty or thirty of some of these birds are to be seen, coming from the north to settle here during the breeding-season. By the beginning of December they have all settled down; each tribe knows its appointed time, and arrives year after year with the utmost regularity within a fortnight, later or earlier, depending partly on the seasons. Some, from the lateness at which they arrive, appear to have come from great distances. They commence immediately by building their nests or repairing the old ones, preparatory to depositing their eggs. When they have fully settled down, the scene becomes one of great interest and animation.

During the day the majority are out feeding, and towards evening the various birds begin to arrive in parties of ten, fifteen, or more, and in a short time the trees are literally covered with bird-life: every part of the crown is hidden by its noisy occupants, who fight and struggle with each other for perches; each tree appears like a moving mass of black, white, and grey; the snowy-white plumage of the Egrets and Curlews contrasting with, and relieved by the glossy black of the Water-crows and Darters and by the grey and black plumage of the Storks.

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* A cawnie is 6400 square yards.

The nests lie side by side, touching each other; those of the different species arranged in groups of five or six, or even as many as ten or twenty, on each tree.

The nests are shallow, and vary in inside diameter from 6 to 8 inches, according to the size of the bird.

The Curlews do not build separate nests, but raise a large mound of twigs and sticks, shelved into terraces as it were; and each terrace forms a separate nest: thus eight or ten run into each other. The Storks sometimes adopt a similar plan.

The whole of the nests are built of sticks and twigs, interwoven to the height of 8 or 10 inches, with an outside diameter of 18 to 24 inches; the inside is slightly hollowed out, in some more and in others less, and lined with grass; reeds and quantities of leaves are laid on the nests. In January the callow young are to be seen in the nests. During this time the parent birds are constantly moving on the wing, backwards and forwards, in search for food, now returning to their young loaded with the spoil, and again, as soon as they have satisfied their cravings, going off in search of a further supply. About the end of January or early in February the young are able to leave their nests and scramble into those of others. They begin to perch about the trees, and by the end of February or the beginning of March those that were hatched first are able to take wing and accompany their parents on foraging expeditions; and a week or two later, in consequence of the drying up of the tanks in the vicinity, they begin to emigrate towards the north with their parents and friends, except perhaps a few whose young are not as yet fledged, and who stay behind some time longer. Thus, in succession, the different birds leave the place, so that it is completely deserted by the middle of April, by which time the tank also becomes dry; and the village cattle graze in its bed, or shelter themselves under the trees from the scorching heat of the midday sun, while the cow-boys find amusement in pulling down the deserted nests.

This village and tank are completely isolated from the public thoroughfare, and very few seem aware of its existence. The villagers hold an agreement, from the ancient Nabob's government, which continues in force by a renewal from the British Government, that no one is to shoot over the tank, which is strictly enforced to the present day; and the birds continue in undisturbed possession of this place as a favourite breeding-resort every winter or monsoon.

The natives understand the value of the dung of the birds in enriching their rice-fields; and when the tank becomes dry, the silt deposited in its bed is taken up to the depth of a foot, and spread over the rice-fields; consequently they are careful not to disturb the birds.

When I first discovered the locality, I was under the impression that the birds were venerated from some superstitious motives, but an acquaintance with the villagers undeceived me as to this point. Anxious to examine the nests, I visited the locality at various periods when the tank was full of water, first in January, and subsequently on the 8th of March, 1864. I caused a raft of wood to be constructed for the occasion. On the last excursion I was accompanied by some of the European and native officials of the district; and we were pushed along on the raft by two fishermen swimming one on either side, their heads only visible above water, whilst the tank bund was lined with the villagers, who witnessed our operations with great curiosity. As we approached the trees the birds at first remained quite unconcerned, but as we got nearer they began to look on with amazement at a scene which was evidently new to them; then they rose *en masse* over our heads, and uttering piercing cries, some, with threatening gestures, rested a moment on the adjoining trees, and then took to their wings again: although so crowded, they performed their evolutions with the greatest nicety and dexterity, never interfering with each other's movements. Some ascended to a great height, and were hardly perceptible in the air, while others gyrated immediately above our heads; many crowded on adjoining trees, and witnessed our intrusion with dismay. On the first occasion, in January 1864, I was alone on the raft; most of the young of the Water-crows, Storks, Herons, and Darters were fully feathered, and were able to scramble to other nests, and some to the tops of trees; a few nests contained eggs, and others callow young. The Water-crows and Darters, young as they were, immediately took to the water and dived out of sight. On the second occasion, in March last, the young of the Ibises were fully feathered, as were also a few Grey and Purple Herons and Darters; two or three nests only contained eggs, and some few callow young.

The following is a detailed account of the nests, and of the number of eggs, or young, I found in each nest on the different times I visited the place:—

1. The small Grey and Black Stork, *Leptoptilos Javanica*? ; Tamil name, *Nutha coottee narai*; literally "Shell-fish- (*Ampullaria*) picking Crane." These birds were the most numerous; their nests were two feet in diameter, and contained three eggs or young. The eggs were of a dirty-white colour, of the same shape, but not quite so large, as those of the Turkey. The young when fully feathered were in prime condition. The flesh is eaten by Mussulmans and Pariahs. I remember on one occasion, when one was shot in the jungles of Orissa, one of the Sepoys, a Bengal Bramin, begged for the dead bird, which was given him; and after eating it he came back to say he had enjoyed his dinner greatly. That he had made a hearty one was evidenced by his protuberant stomach. The bird is common about here, but keeps entirely to marshy fields, edges of tanks, &c.; it never approaches towns. Some half-dozen or more of these birds may often be seen in the morning sunning themselves with outstretched wings in the dry fields. They only differ from the Adjutant (or *Leptoptilos Argala*) in size and colour. These nest early, and the young are firm on the wing in the month of February.

2. The Ibis or Curlew, *Ibis Falcinellus** ; Tamil, *Arroova mooken*, literally "Sickle-nosed," which name they take from their long curved beaks. The nest of this bird contained from three to five eggs, and I found from three to four young in each nest. The eggs resemble in size and shape a medium-sized hen's egg, but are of a dirty-white colour. The birds are white, with black head, feet, and neck, and have a long curved black bill. The head and neck are naked, and the tail-feathers of rather a rusty-brown colour; the lower sides of the wings, from the axillæ to the extremities, are naked; and the skin in the old birds is of a deep scarlet colour; in the young this is absent, although the part is naked. The young are fully fledged in March, and take to the wing in April.

3. The Grey Heron, *Ardea cinerea*; Tamil, *Narai*, sometimes *Pamboo narai*, or Snake Crane; has a similar nest, built of twigs, containing sometimes two, sometimes three eggs. I only found

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* *Falcinellus igneus*, Gould.

two young in the nests; they are fledged from January to April, according to the time of depositing their eggs, which some do earlier than others. The eggs are of a light-green colour; they are not so large in circumference as a large-sized hen's egg, but are longer, with the small end sharp.

4. The Purple Heron, *Ardea purpurea*; Tamil, *Cumbly narai*, or Blanket Crane. Nest the same; deposits two to three eggs, of same size and colour as last; seems to rear only two young. The young are fully fledged in April.

5. *Ardea Nycticorax*; Tamil, *Wukka*. Nests are built after the same fashion, but smaller in size, and contain five eggs; hatches four or five young; eggs the size of a bantam's, and of the same shape. The young are fledged in April.

6. The Cormorant, *Graculus pygmæus*; Tamil, *Neer cakai*, or Water-crow. Nest the same as the others, built of sticks; deposits three or four eggs, and rears three or four young, which are fledged and on the wing in January; eggs like those of a small-sized bantam's, rather sharp-pointed at small end, with a slight greenish tinge.

7. The Large Cormorant, *Graculus Siennensis*; Tamil, *Peroon neer cakai*, or Large Water-crow. Builds a very rude nest, chiefly formed of sticks; lays four eggs, and rears two, three, or four young. The eggs are the size of a medium-sized domestic hen's, and have a slight greenish tinge; the young are fledged sometimes in January, sometimes in March, according to the time of their nesting. These birds, as well as *G. pygmæus*, are to be seen fishing in the tank itself; and the rapidity with which they find their prey, by diving, is wonderful.

8. The Darter, *Plotus melanogaster*; Tamil, *Pamboo Thalai neer cakai*, or Snake-headed Water-crow. Nest same as last; three, sometimes four eggs of same size and colour; young fledged and on the wing, some in January, others not till April.

I succeeded in capturing young of all the birds described here, and sent them to the People's Park at Madras. I was in great hopes of sending a few of each to the Zoological Society's Gardens, Regent's Park, London, by Mr. Thompson, the head keeper, of whose intended visit to India in the "Hydaspes" the Secretary, Dr. Sclater, obligingly apprised me, but unfortunately I lost the opportunity, which I greatly regret.

Returning to the subject of Vaden Thaugul, the villagers tell me that the Pelican sometimes comes and breeds here, as also the

Black Curlew. Occasionally different kinds of Teal, Widgeons, &c., are said to nest in the rushes that bound the inner surface of the tank bund. But, although I visited this place frequently, I saw no other birds than those described here.

The Egrets, or *Herodias Garzetta*, *Bubulcus*, and *intermedia*, were congregated in very large numbers, and roosted on the trees at night; but they do not nest, which seems singular. The natives had observed this, and I found it to be the case. Yet I believe, of all the birds that assemble here, these occur in the greatest number. *Ardea alba*, or *Herodias alba*, and *H. intermedia* are also found here; and the natives say that they breed, but I did not find any of their nests in the place during my visits to Vaden Thaugul.

A brief Account of the *Myrmica Kirbii* as found in Southern India. By JOHN SHORTT, M.D., F.L.S.

[Read Nov. 3, 1864.]

SOME years ago, when in medical charge of the Ganjam trigonometrical survey, in the jungles of Orissa, my attention was drawn to nests of this species of Ant, which, I believe, has been described by Colonel Sykes. A trip last year to the Shervaroys gave me further opportunities of examining these nests more carefully, and also afforded me the opportunity of watching the habits of the ants, as they are very plentiful on this plateau; and believing that any information on the subject may prove interesting, I beg to submit a short account of the same to the Society.

The nests of these ants are built on different kinds of trees and shrubs. I have found them on the *Syzygium Jambolana*, *Coffea Arabica*, *Psidium pomiferum*, *Citrus Aurantium*, &c. The largest nest I ever saw was taken from a *Syzygium Jambolana* at Nagalore, Shervaroy Hills, and is now in my possession; it weighs 3lbs. 8oz., is irregularly oval in form, its extreme length is 19½ inches, its girth or circumference in the centre 32½ inches, and it is sufficiently solid to withstand moderate force. I had some difficulty in securing the nest, in consequence of the ferocity of its inmates; and the tree was of some height. The nest was situated about 30 feet from the ground, on a fork of the tree, and was built round some of the branches, which protruded through it in various directions; the girth of the thickest or lowermost branch of the fork measured $1\frac{3}{4}$ inch; all the other branches that protruded through the nest were much smaller.

The structure was made up of a fine mixture of cowdung and leaves of various kinds; but the outside was well smeared with cowdung, and honeycombed with tile-like appendages, which, whilst they permitted the free ventilation of the interior, at the same time, by a slight projection of the scale-like eaves, rendered the nest impervious to rain.

The interior was composed of irregularly tunnelled cells, comprising nurseries, stores, &c.

At Yercand, on the Shervaroys, I on one occasion procured two nests of small size (about that of a medium-sized cocoa-nut with the husk on) from two different coffee shrubs, and placed them one on either side of a window-sill in a bath-room, in the hope of watching their habits.

It was amusing to witness the threatening attitudes these diminutive creatures put on, with their abdomens flexed over their back or thorax, and their mandibles extended. They ran to and fro in a state of excitement in search of the enemy, on whom, when found, they at once advanced, and used their expanded jaws to such purpose as to cause extreme pain to the individual attacked. Considering their small size, the ferocity and undaunted courage they exhibited, and their readiness to attack man or beast who approached them were very remarkable. It was late one evening when I placed the nests in the window; early next morning I returned to see how they were, and, to my great astonishment, the window-sill was completely covered with dead and dying ants. On further examination I found that a battle had taken place between the inhabitants of the two nests; and so ferocious were the little creatures, that I found numbers even in death clinging to each other; and the battle had been so vigorously contested that the survivors were but few in number. The victors were already busily engaged in plundering the nest of the vanquished of its cocoons, and carrying them off to their own. I regretted extremely that I had lost the opportunity of witnessing so interesting a sight as this battle must have been; and as I had to leave the place a few days after, I had no opportunity of procuring another nest. I examined numerous deserted and broken-down nests, and found that all of these had been taken possession of by one or more millepedes, or *Iulus*. Whether these animals had destroyed the ants and taken possession of their nests, or whether they had merely sought shelter in their deserted habitations, I am not prepared to say. As the millepedes are considered to feed on vegetables, it is possible that they had taken possession of these abodes to feed at leisure on their structure. I am the more inclined to this opinion from the worm-eaten appearance of some of the deserted nests.

Descriptions of New Species of the Dipterous Insects of New Guinea. By FRANCIS WALKER, F.L.S.

[Read March 3, 1864.]

Fam. MYCETOPHILIDÆ, *Haliday*.

Gen. SCIARA, *Meigen*.

1. SCIARA VARIPES. *Fœm.* Testacea, antennis nigricantibus basi testaceis, pedibus longiusculis, tarsis nigris, alis cinereis.

Female. Testaceous. Antennæ blackish, testaceous towards the base, not longer than the thorax. Abdomen a little longer than the thorax. Legs slender, rather long; tarsi black. Wings cinereous; veins black; radial vein extending a little beyond the fork of the subapical vein. Length of the body 2 lines; of the wings 6 lines.

2. SCIARA? FILIPES. *Mas.* Testacea, gracilis, abdomine attenuato apicem versus nigro, pedibus longissimis, tibiis apice tarsisque fuscescentibus, alis cinereis.

Male. Testaceous, slender. Abdomen attenuated, black towards the tip, more than twice as long as the thorax. Legs slender, extremely long; tarsi and tips of the tibiæ brownish. Wings cinereous; veins brownish; radial vein ending at a little before the fork of the subapical vein; cubital vein very near the costa. Length of the body 3 lines; of the wings 7 lines.

The specimen here described is mutilated, and therefore can hardly be characterized as a new genus.

Fam. CULICIDÆ, *Haliday*.

Gen. MEGARHINA, *Desv.*

3. MEGARHINA INORNATA. *Mas.* Fusca, palpis purpureis argenteo bifasciatis, antennis nigris, pectore femoribusque argenteis, abdomine lurido apicem versus nigro, pedibus non fasciatis, alis fuscescenti-cinereis.

Male. Brown. Palpi purple, with two silvery bands, longer than the thorax. Rostrum black, bent, nearly as long as the abdomen. Antennæ black. Pectus silvery cinereous. Abdomen lurid, black towards the tip, where it is furnished with diverging lateral black hairs. Legs setulose, without bands; femora silvery cinereous, except towards the tips. Wings brownish cinereous; veins brown. Length of the body 6 lines; of the wings 10 lines.

Gen. Culex, *Linn.*

4. Culex ventralis. *Fœm.* Nigricans, pectore argenteo, abdomine subtus fasciis sex argenteo-albis, femoribus argenteo-albidis apice nigricantibus, alis cinereis.

Female. Blackish. Rostrum and palpi black, the former slightly bent downward, a little longer than the thorax. Pectus silvery cinereous. Abdomen beneath with six silvery-white bands. Legs long, slender; femora silvery whitish, except towards the tips; tibiæ and tarsi setulose. Wings cinereous; veins blackish, fringed; fork of the subapical vein rather short. Length of the body 4 lines; of the wings 6 lines.

Fam. CHIRONOMIDÆ, *Haliday.*

Gen. Chironomus, *Meigen.*

5. Chironomus instabilis. *Mas.* Pallide fuscus, nitens, thorace antice producto vittis duabus nigricantibus, pedibus albidis subpubescentibus, alis lacteis.

Male. Pale brown, shining. Eyes deep black. Thorax very prominent in front, with two slender blackish stripes. Legs whitish, long, slender, very minutely pubescent; fore metatarsus almost twice the length of the fore tibia. Wings milk-white; veins white. Length of the body 2½ lines; of the wings 4 lines.

Fam. TIPULIDÆ, *Haliday.*

Gen. Limnobia, *Meigen.*

6. Limnobia plenipennis. *Mas.* Badia, capite nigro, thorace antice attenuato, abdomine brevi subochraceo apicem versus nigro, femoribus testaceis apice fuscis, alis cinereis luteo variis, vittis tribus deviis nigricantibus, maculis guttisque albis.

Male. Chestnut colour, shining. Head, palpi, and antennæ black. Thorax attenuated in front; pectus testaceous in front. Abdomen short, dull ochraceous, black towards the tip, very little longer than the thorax. Legs brown, long, slender; coxæ and femora testaceous, the latter with brown tips. Wings cinereous; basal and subapical parts pale luteous; three irregular blackish stripes; first stripe costal, terminated by a white transversely elongated blackish-bordered spot; second including two elongated white spots and two white points, beyond which there are two white blackish-bordered dots; third paler and diffuse, including one elongated white spot; a discal areolet; radial vein not forked; first externo-medial vein not forked; no second externo-medial vein; third externo-medial vein forked; one veinlet between the third externo-medial vein and the subanal vein, nearer than the discal areolet to the base of the wing; halteres testaceous, with white knobs. Length of the body 5 lines; of the wings 14 lines.

7. LIMNOBIA LATIFASCIA. *Fœm.* Atra, abdomine fascia latissima lutea, femoribus basi luteis, alis nigris fascia latissima lutea, gutta costali alba.

Female. Deep black. Abdomen with a very broad pale luteous band, which extends from near the base to much beyond the middle. Femora pale luteous towards the base; this hue is most prevalent in the fore femora. Wings black, with a very broad pale luteous middle band; a white costal dot adjoining the exterior black part, and bordered with black on the inner side; veins like the wings in colour; halteres black. Length of the body 6 lines; of the wings 14 lines.

In structure like *L. euchroma*, Journ. Linn. Soc. vol. vi. p. 4.

8. LIMNOBIA INFIXA. *Mas.* Testacea, capite nigro, thorace antice attenuato, abdomine longo fasciis nigricantibus, alis cinereis guttis tribus costalibus fuscescentibus.

Male. Testaceous. Head, palpi, and antennæ black. Antennæ moniliform, tapering, shorter than half the length of the thorax. Thorax attenuated in front. Abdomen long, with a blackish band along the fore border of each segment, about thrice the length of the thorax. Wings cinereous; three brownish dots along the costa, the first at the base of the radial vein; veins black, testaceous at the base; a discal areolet; radial vein forked, the forks slightly curved downward; first externo-medial vein not forked; one veinlet between the third externo-medial vein and the subanal vein, opposite the base of the discal areolet. Length of the body 6½ lines; of the wings 14 lines.

9. LIMNOBIA CONTINGENS. *Mas.* Pallide lutea, capite nigro, thorace strigis duabus obliquis vittaque nigris, abdomine segmentorum marginibus apiceque nigris, alis pallide fuscis.

Male. Pale luteous, slender. Head black, shining. Thorax in front with a black stripe and two oblique black streaks. Abdomen thrice the length of the thorax, shining towards the base, black and shining towards the tip; hind borders of the segments black. Wings pale brown; veins black; a discal areolet; radial vein forked; first externo-medial vein forked, with a petiole between its forks and the discal areolet; one veinlet between the third externo-medial vein and the subanal vein, joining the discal areolet near the base of the latter; halteres with black knobs. Length of the body 6 lines; of the wings 12 lines.

10. **LIMNOBIA EXCLUSA.** *Fœm.* Lutea, capite nigro, thorace litura trifurcata guttisque duabus posterioribus nigris, abdomine apice nigro, pedibus nigris femoribus basi luteis, alis limpidis fascia diffusa fuscescente antice nigra postice obsoleta.

Female. Luteous, shining. Head, palpi, and antennæ black. Head small, attached to the thorax by a very slender petiole. Palpi elongated. Antennæ moniliform, setaceous, minutely setulose, a little more than half the length of the thorax. Thorax with a trifurcate black mark and with two hinder black dots. Abdomen rather short, with a black tip. Legs black, stout; femora towards the base and coxæ pale luteous. Wings limpid; veins black; costa pubescent, black and incrassated from somewhat before the middle to the tip of the cubital vein; discal areolet long; radial vein and first externo-medial vein not forked; one veinlet between the third externo-medial vein and the subanal vein, joining the discal areolet near the base of the latter; axillary vein undulating; a brownish diffuse band across the base of the discal areolet, obsolete hindward, black towards the costa. Length of the body 4 lines; of the wings 8 lines.

11. **LIMNOBIA TRISIGNATA.** *Fœm.* Flava, capite nigricante, palpis apice nigris, abdomine fascia postica atra, pedibus nigris femoribus basi flavis, alis nigricantibus basi fascia media maculaque discali albis.

Female. Pale yellow. Head blackish. Palpi with black tips. Abdomen with a deep black band towards the tip, which is attenuated Legs black, stout; femora at the base and coxæ pale yellow. Wings blackish, white towards the base, with a white middle band, and with a white discal spot towards the tip; veins black, pale yellow towards the base; discal areolet pentagonal; radial vein and first externo-medial vein not forked; second externo-medial vein much nearer to the first than to the third externo-medial vein; one veinlet between the third externo-medial vein and the subanal vein, joining the discal areolet at somewhat before the middle of the latter; axillary vein slightly undulating; halteres with brown knobs. Length of the body 6 lines; of the wings 12 lines.

Gen. TIPULA, *Linn.*

12. **TIPULA PALLIDA.** *Mas.* Pallide testacea, capite postico cinereo, thorace vitta cinerea interlineata postice albido-testaceo, abdomine lutescente basi pallido apice fusco, pedibus longissimis, alis subcinereis venis luteis albo binotatis.

Male. Pale testaceous; in structure like *T. infindens.* Head pale cinereous hindward. Antennæ not longer than the palpi. Thorax with an indistinct cinereous interlined stripe; hind part whitish testaceous.

Abdomen dull luteous, pale at the base, brown at the tip. Legs very long. Wings long, slightly cinereous; veins luteous, with two white marks, one on the veinlets near the base, the other on the veinlets in front of the discal areolet; stigma testaceous; halteres with brownish knobs. Length of the body 12 lines; of the wings 32 lines.

Gen. PACHYRHINA, *Macq.*

13. PACHYRHINA TENUIS. *Mas.* Flava, capitis vitta palpis apice antennis thoracis disco abdomineque nigris, abdomine fasciis quatuor angustis flavis fasciaque subapicali lata flavescente, pedibus fulvescentibus tarsis nigris, alis subcinereis.

Male. Pale yellow, slender. Head with a black discal stripe. Palpi black towards the tips. Antennæ black, except at the base. Disk of the thorax black, with the exception of a short oblique yellow streak on each side in front. Metathorax black. Abdomen black, with four narrow pale yellow bands; a broad yellowish subapical band. Legs slender, dull pale tawny; tibiæ darker than the femora; tarsi black. Wings slightly cinereous; veins black; stigma brown; halteres with blackish knobs. Length of the body 7 lines; of the wings 14 lines.

Fam. STRATIOMIDÆ, *Haliday.*

Gen. CLITILLARIA, *Meigen.*

14. CLITILLARIA RESPONSALIS. *Fœm.* Nigra, antennis articulo 3° intus albo, thorace cinereo tomentoso vitta dorsali maculisque quatuor nudis, abdomine vitta postica maculisque quatuor trigonis argenteis, femoribus lividis apice nigris, tibiis tarsisque posterioribus albidis apice nigris, alis cinereis, halteribus albidis.

Female. Black. Head with silvery cinereous tomentum in front and about the eyes. Antennæ nearly as long as the breadth of the head; third joint white on the inner side. Thorax covered with cinereous tomentum, excepting a dorsal stripe and two spots on each side. Abdomen with a short hindward silvery stripe, and with two triangular silvery spots on each side. Femora livid, except towards the tips; posterior tibiæ and tarsi whitish, with black tips. Wings cinereous; veins black; halteres whitish. Length of the body 5 lines; of the wings 8 lines.

This species is closely allied to *C. bivittata*, from which it may be distinguished by its smaller size, its broader antennæ, the narrower stripe and smaller spots of the thorax, and the wings without any blackish tinge.

Gen. STRATIOMYS, *Geoffr.*

15. STRATIOMYS ATRARIA. *Mas et Fœm.* Atra, antennis basi fulvis,

scutello spinis piceis, abdominis lateribus rufescentibus, tibiis tarsisque fulvis apice nigris, alis cinereis basi luridis striga costali nigra, halteribus testaceis.

Male and Female. Deep black, dull. Antennæ tawny towards the base, much shorter than the breadth of the head. Scutellum with two piceous spines. Abdomen reddish along each side. Tibiæ and tarsi tawny, the latter with black tips. Wings cinereous, with a lurid tinge towards the base; a black streak along the middle part of the costa; veins black; halteres testaceous. *Female.* Head shining. Length of the body 4 lines; of the wings 7 lines.

16. STRATIOMYS PARALLELA. *Mas.* Nigra, antennis basi rufescentibus, thorace vittis quatuor, scutelli margine postico pectorisque maculis quatuor albidis, abdomine fulvo vitta dorsali lata nigra basi dilatata, genibus tarsisque fulvis, alis limpidis, halteribus albidis.

Male. Black. Head reddish on each side of the mouth. Antennæ with the first and second joints reddish; scape lanceolate, a little longer than the first and second joints together. Thorax with four whitish slender stripes; hind border of the scutellum whitish, with two whitish spines; pectus with two whitish spots on each side. Abdomen tawny, with a broad black dorsal stripe, which is dilated at the base on each side. Tarsi, except towards the tips and knees, tawny. Wings limpid; veins pale tawny; halteres whitish. Length of the body 6 lines; of the wings 9 lines.

Gen. SARGUS, *Fabr.*

17. SARGUS FORTIS. *Mas.* Niger, antennis testaceis, scutelli margine postico spinisque quatuor albis, pedibus albidis, tibiis tarsisque anticis nigricantibus, femoribus tibiisque posterioribus piceis, alis cinereis apice nigricantibus, halteribus albidis apice nigris.

Male. Black, shining; closely allied to *S. tenuis.* Antennæ pale testaceous; third joint round; arista black, very slender, about twice the length of the antennæ. Thorax a little narrower in front; scutellum prominent, with a white hind border and with four white spines. Abdomen rather longer than the thorax. Legs whitish; fore tibiæ and fore tarsi blackish; posterior femora and tibiæ piceous, except towards the base; posterior tarsi with black tips. Wings cinereous, blackish towards the tips, this hue darkest and most extensive along the costa; veins black, whitish at the base; halteres whitish, with black tips. Length of the body 4½ lines; of the wings 8 lines.

Gen. RUBA, *Walk.*

18. RUBA OPPONENS. *Mas.* Testacea, antennis nigris basi testaceis, abdomine nigro, tarsis anterioribus piceis, tarsis posticis nigris, alis nigricantibus postice fuscis, halteribus testaceis.

Male. Testaceous, with pale pubescence. Antennæ shorter than the breadth of the head; scape black. Abdomen black, with whitish pubescence, rather longer and much broader than the thorax. Anterior tarsi piceous, except towards the tips; hind tarsi black. Wings blackish, brown hindward; veins black; halteres testaceous. Length of the body 3 lines; of the wings 6 lines.

Fam. TABANIDÆ, *Leach.*

Gen. PANGONIA, *Latr.*

19. PANGONIA CALIGINOSA. *Fœm.* Piceo-nigra, capite subtus pectoreque albido pilosis, proboscide thoracis longitudine, antennis rufescentibus apice nigricantibus, alis nigricantibus maculis duabus discalibus cinereis.

Female. Piceous black. Head beneath and pectus thickly clothed with whitish hairs. Proboscis as long as the thorax. Palpi piceous. Antennæ reddish, lanceolate, curved upward, piceous at the base, blackish at the tips. Thorax with a line of black hairs along each side. Abdomen oval, longer and broader than the thorax; hind borders of the segments piceous. Wings blackish, cinereous towards the hind border, with two elongated paler cinereous discal spots; veins black; fore branch of the cubital vein slightly curved, forming a slightly obtuse angle at its flexure, from whence it emits a short branch. Length of the body 6 lines; of the wings 16 lines.

Gen. TABANUS, *Linn.*

20. TABANUS COHÆRENS. *Fœm.* Piceus, antennis ochraceis apice nigris, abdomine fulvo apice nigricante segmentorum marginibus posticis vittaque testaceis, pedibus fulvis, tarsis posterioribus femoribusque anticis piceis, tibiis anticis apice tarsisque anticis nigricantibus, alis cinereis apud costam fuscescentibus.

Female. Piceous; closely allied to *T. serus.* Head, thorax, and pectus with hoary tomentum. Head with a slender piceous callus which is dilated in front. Antennæ ochraceous, piceous at the base, black towards the tips; third joint with a very small horn. Abdomen tawny, blackish towards the tip; hind borders of the segments testaceous, this hue most apparent on the hinder segments; a dorsal testaceous stripe, which is slightly dilated hindward, and is obsolete at the base and at the tip. Legs tawny; coxæ hoary; posterior tarsi, except at the base, and fore femora piceous; fore tibiæ towards the tips and fore tarsi blackish. Wings cinereous, brownish along the costa; veins black, tawny at the base; fore branch of the cubital vein almost straight, forming an obtuse and rounded angle at its flexure; halteres testaceous. Length of the body 7 lines; of the wings 14 lines.

21. TABANUS PAPOUINUS. *Mas.* Piceus, antennis rufescentibus apice nigris, thorace cinereo tomentoso, abdomine fusco basi fulvo segmen-

torum marginibus posticis cinereis, pedibus fulvis, tarsis piceis, alis cinereis striga costali fusca.

Male. Piceous. Head beneath and pectus with whitish tomentum. Eyes rather broader than the thorax, divided, as in many other species, into large and small facets, the former reddish, the latter blackish. Antennæ reddish, piceous at the base, black towards the tips; third joint with an extremely small horn. Thorax with cinereous tomentum. Abdomen brown, conical, tawny towards the base; hind borders of the segments pale cinereous. Legs tawny; coxæ hoary; posterior tarsi piceous, tawny towards the base; fore tibiæ towards the tips and fore tarsi piceous. Wings cinereous, with a brown streak along the costa beyond the middle; veins black, piceous at the base; fore fork of the cubital vein almost straight, forming a fork at its flexure; halteres piceous. Length of the body 5 lines; of the wings 12 lines.

22. TABANUS BREVIUSCULUS. *Mas.* Fulvus, capite subtus pectoreque cinereo tomentosis, thorace antico vittis tribus cinereis, abdomine apice pedibus anticis tarsisque piceis, alis cinereis striga costali lurida.

Male. Tawny; in structure like the preceding species. Head beneath and pectus with cinereous tomentum. Eyes without the black line of minute facets along the hind border which distinguishes the preceding species. Proboscis black. Antennæ tawny. Fore part of the thorax with three cinereous stripes. Abdomen piceous towards the tip. Tarsi and fore legs piceous. Wings cinereous, with a lurid streak along the costa beyond the middle; veins black, tawny towards the base; fore branch of the cubital vein straight, slightly curved towards its base and towards its tip. Length of the body 4½ lines; of the wings 11½ lines.

Fam. ASILIDÆ, *Leach.*

Subfam. DASYPOGONITES, *Walk.*

Gen. DASYPOGON, *Fabr.*

23. DASYPOGON INDECORUS. *Mas.* Nigro-piceus, capite apud oculos subaurato, mystace albo minimo, thorace suturis subauratis maculis duabus lateralibus rufescentibus, abdomine petiolato segmentorum 2^i et 3^i marginibus posticis rufescentibus, femoribus tibiisque piceo-rufescentibus, alis cinereis apice nigricantibus.

Male. Piceous black. Head with white tomentum behind, slightly gilded in front along the eyes; front flat; mystax composed of very few slender white bristles. Proboscis and palpi black. Antennæ slender, linear, nearly as long as the breadth of the head. Thorax with the sutures slightly gilded; a reddish spot on each side at the base of the fore wing. Pectus with a silvery band on each side. Abdomen petiolated; hind borders of the second and third segments reddish. Legs reddish, smooth, shining, partly tinged with piceous; tarsi blackish. Wings cinereous, blackish towards the tips; veins black; halteres dingy testaceous. Length of the body 6 lines; of the wings 12 lines.

Subfam. LAPHRITES, *Walk.*

Gen. LAPHRIA, *Fabr.*

24. LAPHRIA TIBIALATA. *Mas et Fœm.* Nigra, capite argenteo antice subaurato, antennarum articulo 3º fusiformi, thoracis maculis lateralibus subaurato-albidis, abdomine purpurascente maculis lateralibus transversis argenteis, tibiis anticis et posticis subtus argenteo pilosis, alis cinereis apud venas fuscescentibus.

Male and Female. Black. Head silvery white, slightly gilded in front; mystax composed of a few black and white bristles; beard white, shining. Third joint of the antennæ fusiform, a little longer than the first and second. Thorax on each side with several whitish shining spots which are more or less gilded in some aspects. Abdomen purplish blue or purple; each segment with a transverse silvery spot accompanied by a bristle on each side. Legs greenish black, stout, bristly; coxæ silvery; fore tibiæ and hind tibiæ with silvery hairs beneath, except towards the base; pulvilli ochraceous. Wings cinereous, diffusedly brownish about most of the veins; veins black; halteres pale tawny. Length of the body 9–10 lines; of the wings 19–20 lines.

25. LAPHRIA PLACENS. *Mas et Fœm.* Cyanea, capite albido, antennis nigris, abdomine fasciculis lateralibus albis, alis cinereis fasciis tribus nigris apud costam connexis, halteribus albis.

Male and Female. Dark blue. Head with shining whitish tomentum; mystax composed of a few white bristles; beard very small. Antennæ black; third joint slightly tapering, much longer than the first and second together. Pectus with cinereous tomentum. Abdomen linear, partly tinged with purple; each segment with a small tuft of white hairs on each side. Legs hardly stout, slightly bristly. Wings cinereous, with three black bands which are connected on the costa; third band apical, connected with the second on the hind border; veins black; halteres white. Length of the body 5 lines; of the wings 9 lines.

26. LAPHRIA PIPUNCULOIDES. *Mas.* Cyanea, facie alba, antennis abdomineque nigris, pedibus rufescentibus, tibiis tarsisque posticis nigris, alis cinereis, halteribus albidis.

Male. Blue, shining, not bristly. Head broader than the thorax, with shining white tomentum on the face, which is very narrow. Eyes flat in front. Proboscis black, very short. Antennæ black. Abdomen black, slightly broader hindward, about twice the length of the thorax. Legs reddish, slightly bristly; hind tibiæ and hind tarsi black. Wings cinereous; veins black, piceous at the base; halteres dingy whitish. Length of the body 4 lines; of the wings 7 lines.

Fam. BOMBYLIDÆ.

Subfam. THEREVITES, *Walk.*

Gen. THEREVA, *Latr.*

27. THEREVA?? FUNEBRIS. *Fœm.* Nigra, non pilosa, capite luteo nitente, pectore halteribusque piceis, tarsis flavescentibus, alis nigricantibus.

Female. Black, dull. Head luteous, smooth, shining. Antennæ and palpi black. Pectus piceous, shining. Abdomen of equal breadth for more than half the length, tapering from thence to the tip. Tarsi pale dull yellowish, blackish towards the tips. Wings blackish, darkest along the costa; veins black; halteres piceous. Length of the body 5 lines; of the wings 10 lines.

This species hardly belongs to *Thereva*, but I have deferred separating it into a new genus.

Subfam. BOMBYLITES, *Walk.*

Gen. ANTHRAX, *Fabr.*

28. ANTHRAX APICIFERA. *Mas.* Atra, antennis brevissimis articulo 3° rotundo, abdomine apice albo, alis nigris spatio apicali obliquo inciso cinereo guttas duas nigras includente.

Male. Deep black; like *A. emittens* in structure. Head conical; eyes elongated. Antennæ very short; third joint round. Abdomen white at the tip. Legs very slender. Wings black, elongated, hyaline towards the tips; the outline of the black part oblique, forming some semidetached dots; two subapical black dots; veins and halteres black. Length of the body 3 lines; of the wings 8 lines.

Fam. EMPIDÆ, *Leach.*

Gen. HYBOS, *Fabr.*

29. HYBOS STIGMA. *Mas.* Niger, tarsis fulvis, femoribus intermediis basi flavis, tibiis posticis setosis, alis cinereis apice fuscescentibus, halteribus flavescentibus.

Male. Black, shining. Third joint of the antennæ elliptical, a little longer than the second joint; arista a little shorter than the third joint. Legs slender; tarsi tawny; middle femora pale yellow towards the base; hind tibiæ setose. Wings cinereous, brownish towards the tips, this hue darkest towards the stigma, which is large and black; veins black; halteres pale yellowish. Length of the body 2 lines; of the wings 4 lines.

Fam. DOLICHOPIDÆ, *Leach.*

Gen. PSILOPUS, *Meigen.*

30. PSILOPUS EXTENDENS. *Fœm.* Purpureo-cyaneus, proboscide pal-

pisque fulvis, antennis ferrugineis arista thorace longiore, thorace vittis tribus cupreis viridi marginatis, abdomine fasciis quatuor atris, pedibus nigris, femoribus luteis apice nigris, tibiis basi piceis, alis vitta costali lata fasciisque duabus subabbreviatis nigricantibus.

Female. Bright purplish blue; nearly allied to *P. varipennis*. Head in front and pectus with silvery tomentum. Proboscis and palpi tawny. Antennæ ferruginous; arista black, rather longer than the thorax. Thorax with three cupreous green-bordered stripes. Abdomen with four deep-black bands. Legs black; femora luteous, black towards the tips; tibiæ piceous towards the base; fore femora and fore tibiæ with long bristles; posterior tibiæ with short bristles. Wings limpid, with a broad blackish costal stripe which emits two irregular bands nearly to the hind border; veins and halteres black; fore branch of the præbrachial vein forming a curve near its base, hardly undulating from thence to its tip; discal transverse vein most deeply undulating. Length of the body 4½ lines; of the wings 10 lines.

Gen. DOLICHOPUS, *Latr.*

31. **DOLICHOPUS VICARIUS.** *Fœm.* Læte viridis, capite cyaneo, antennis fulvis, abdomine æneo-viridi suturis nigris plagis lateralibus argenteis, pedibus lutescentibus, femoribus posticis tibiisque posterioribus apice tarsisque posterioribus nigris, alis cinereis, halteribus lutescentibus.

Female. Bright green. Head bright blue; face silvery. Antennæ tawny; third joint short, conical; arista short. Thorax very setose. Abdomen æneous green, with silvery cinereous patches on each side; sutures black. Legs lutescent; hind femora and posterior tibiæ with black tips, the latter very setose; posterior tarsi black. Wings cinereous; veins black; præbrachial vein slightly bent exteriorly towards the cubital vein; halteres lutescent. Length of the body 1¾ line; of the wings 3½ lines.

Fam. SYRPHIDÆ, *Leach.*

Gen. PARAGUS, *Latr.*

32. **PARAGUS VENOSUS.** *Fœm.* Nigro-cyaneus, capitis vitta chalybæa, antennis nigris, abdomine plagis quatuor lateralibus albidis segmento 1° livido, tibiis basi albis, metatarsis subtus rufescentibus, alis cinereis, halteribus albis.

Female. Blackish blue. Head with a chalybeous stripe between the eyes. Antennæ black; third joint oval, as long as the second; arista not longer than the third joint. First abdominal segment livid; second and third segments with a whitish patch on each side hindward. Tibiæ white towards the base; metatarsi reddish beneath. Wings cinereous; veins black, clouded with blackish; halteres white. Length of the body 3½ lines; of the wings 8 lines.

33. Paragus luctiferus. *Fœm.* Niger, scutello pectoreque ferrugineis, abdomine cyaneo strigis quatuor lateralibus transversis punctisque duobus apicalibus albidis, tarsis halteribusque fulvis, alis cinereis.

Female. Black, dull. Head shining. Scutellum and pectus dull ferruginous. Abdomen dark blue, elongate oval, slightly shining, with two transverse whitish streaks on each side and with two apical whitish points. Tarsi tawny. Wings cinereous; veins black; halteres tawny. Length of the body 5 lines; of the wings 10 lines.

34. Paragus incisuralis. *Fœm.* Cyaneus, capite thoraceque nigro pubescentibus, antennis pedibusque nigris, segmentorum abdominalium marginibus posticis utrinque canis, tibiis basi subtus fulvis, alis nigris gutta subapicali maculisque tribus marginalibus cinereis, halteribus albis.

Female. Dark blue, shining. Head and thorax with black pubescence. Head pilose in front; hairs black. Antennæ and legs black. Abdomen elliptical, much broader than the thorax; hind borders of the segments with hoary pubescence on each side. Tibiæ tawny at the base beneath. Wings black, with an elongated cinereous subapical dot, and with three triangular cinereous spots on the hind border; veins black; halteres white. Length of the body 5 lines; of the wings 11 lines.

Gen. Azpeytia, n. g.

Mas. *Corpus* latum, crassum. *Caput* antice subproductum. *Oculi* pubescentes. *Antennæ* breves; articulus 3us longiconicus; arista nuda. *Scutellum* latissimum, margine subretuso. *Pedes* robusti. *Alæ* longæ.

Male. Body broad, thick. Head forming a frontal protuberance on which the antennæ are seated; epistoma slightly prominent. Eyes pubescent, connected on the vertex. Proboscis short. Antennæ short; third joint elongate conical, full twice the length of the second; arista bare, full twice the length of the third joint. Scutellum very broad, with a slightly retuse border. Abdomen longer than the thorax. Legs robust. Wings long; radial and cubital veins ending separately on the border; cubital vein much curved hindward opposite the middle of the subapical areolet; transverse præbrachial vein oblique, placed beyond the middle of the discal areolet; subapical areolet closed by a slightly undulating transverse vein, which is abruptly curved when it approaches the cubital vein.

35. Azpeytia scutellaris. *Fœm.* Nigra, subnitens, thorace plagis duabus lateralibus aurato pilosis, scutello halteribusque piceis, abdomine fasciis duabus interruptis albis, tibiis basi flavescentibus, alis fuscescenti-cinereis spatio costali interiore fusco.

Female. Black, slightly shining. Head clothed with short black hairs. Proboscis piceous. Thorax with a small patch of gilded hairs on each side in front of the wing; scutellum piceous, paler towards its border, which is fringed with short pale hairs. Abdomen with two white interrupted bands. Tibiæ pale yellowish towards the base, this hue extending to nearly half the length of the hind tibiæ. Wings brownish cinereous, dark brown along the costa from the base to beyond the middle; veins black; halteres piceous. Length of the body 7 lines; of the wings 14 lines.

Fam. MUSCIDÆ, *Latr.*

Subfam. TACHINIDES, *Walk.*

Gen. SARALBA, n. g.

Mas. *Corpus* angustum, subcylindricum. *Caput* thorace paulo latius *Oculi* nudi. *Proboscis* acuta. *Palpi* graciles, subclavati. *Antennæ* breves, subgraciles; articulus 3^{us} fusiformis, 2^{o} duplo longior. *Abdomen* basi subcompressum, thorace fere duplo longius. *Pedes* robusti. *Alæ* angustæ.

Allied to *Ocyptera. Male.* Body narrow, nearly cylindrical. Head a little broader than the thorax; frontalia linear; epistoma slightly prominent. Eyes bare. Proboscis acute. Palpi slender, subclavate. Antennæ rather slender, about half the length of the face; third joint fusiform, twice the length of the second; arista slender, more than twice the length of the third joint. Abdomen with many short bristles, slightly compressed towards the base, nearly twice the length of the thorax. Legs stout, setose. Wings narrow; præbrachial vein forming a curve at its flexure, joining the cubital vein at the tip of the wing; discal transverse vein slightly undulating, parted by less than half its length from the border, and by much less than its length from the flexure of the præbrachial vein.

36. SARALBA OCYPTEROIDES. *Mas.* Nigra, capite pectoreque argenteis, frontalibus atris linearibus antice aurato marginatis, palpis testaceis, thorace fasciis duabus cinereis subauratis, abdomine nigricanti-cinereo spatio basali et segmentorum marginibus pallide cinereis vitta dorsali nigra interrupta, femoribus posterioribus basi flavescentibus, alis cinereis dimidio basali nigricante.

Male. Black. Head silvery white; frontalia deep black, linear, with gilded borders in front where the eyes diverge from them; facialia without bristles. Palpi pale testaceous. Thorax with two cinereous slightly gilded bands; second band abbreviated; sides slightly bristly. Pectus silvery. Abdomen semihyaline, blackish cinereous; borders of the segments and the whole of the basal part pale cinereous; a black dorsal line, interrupted on the fore border of each segment. Posterior femora yellowish towards the base, this hue most extended on the hind femora. Wings cinereous, blackish on half the breadth from the costa; veins and halteres black; alulæ lurid, with blackish borders. Length of the body 4½ lines; of the wings 8 lines.

Subfam. DEXIDES, *Walk.*

Gen. RUTILIA, *Desv.*

37. RUTILIA PECTORALIS. *Fæm.* Cærulea, viridi-aurato nitens, capite

argenteo, frontalibus atris, palpis antennisque fulvis, thorace vittis quatuor interruptis nigris, pectore ferrugineo, abdomine atro basi subtus ferrugineo fasciis tribus interruptis cæruleis postice excavatis, tibiis subtus femoribusque ferrugineis, alis cinereis venis ferrugineo marginatis.

Closely allied to *R. glorificans*. *Female.* Cerulean blue, with golden-green reflexions. Head silvery white about the facialia and about the epistoma; frontalia deep black, widening in front. Palpi and antennæ tawny. Thorax with four slender interrupted black stripes; inner pair much abbreviated hindward; outer pair abbreviated in front and hindward. Pectus ferruginous, excepting two patches of the ground hue on each side. Abdomen deep black, ferruginous at the base beneath, with three interrupted bands of the ground hue, which are excavated and tinged with cupreous along their hind borders. Legs black; tibiæ beneath, femora and coxæ ferruginous. Wings cinereous, tinged with ferruginous along the costa and about the veins; veins black; halteres ferruginous. Length of the body 9 lines; of the wings 18 lines.

Subfam. SARCOPHAGIDES, *Walk.*

Gen. SARCOPHAGA, *Meigen.*

38. SARCOPHAGA PERPUSILLA. *Mas et Fœm.* Nigra, capite argenteo, frontalibus atris, thorace vittis quatuor albidis parallelis bene determinatis, abdomine cinereo tessellato, alis cinereis, halteribus albidis.

Male and Female. Black. Head silvery white; frontalia deep black, linear. Thorax with four well-defined parallel whitish stripes; the outer pair connected on the hind border of the scutellum. Pectus cinereous. Abdomen tessellated with cinereous. Wings cinereous; veins black; halteres whitish. Length of the body 2½–3 lines; of the wings 5–6 lines.

Subfam. MUSCIDES, *Walk.*

Gen. PYRELLIA, *Desv.*

39. PYRELLIA FUMIPENNIS. *Mas.* Læte purpurea, cyaneo varia, capite palpis pedibus halteribusque nigris, antennis fulvis, alis nigricanti-cinereis.

Male. Bright purple, with deep-blue reflexions. Head, proboscis, palpi, and legs black. Antennæ tawny; arista black. Wings blackish cinereous; veins and halteres black; præbrachial vein forming a curve at its flexure, slightly bent inward near its tip; discal transverse vein hardly bent inward, parted by little more than half its length from the border, and by nearly its length from the flexure of the præbrachial vein; alulæ dingy cinereous. Length of the body 4 lines; of the wings 7 lines.

Subfam. HELOMYZIDES, *Fallén.*

Gen. HELOMYZA, *Fallén.*

40. HELOMYZA OPTATURA. *Fœm.* Lutescens, capite albido, abdomine maculis duabus lateralibus subapicalibus apiceque nigris, alis *limpidis vitta costali exteriore maculam* albam includente fasciaque nigris.

Female. Pale luteous, smooth, shining. Head and thorax with stout black bristles. Head whitish, excepting the vertex. Antennæ less than half the length of the face; third joint elongate conical, about twice the length of the second; arista black, plumose. Abdomen elliptical, shorter and narrower than the thorax; hairs short, black; a black spot on each side near the tip, which is black. Wings limpid, with a black stripe which begins at a little beyond one-third of the length, extends to the tip, occupies more than half the breadth from the costa, emits a broad band nearly to the hind border, and includes a quadrate white costal spot; veins black, pale luteous towards the base; discal transverse vein straight, parted by half its length from the border, and by about its length from the præbrachial transverse vein. Length of the body 5 lines; of the wings 12 lines.

41. HELOMYZA ORTALIOIDES. *Mas.* Nigra, capite albo, frontalibus piceis, antennis fulvis, thorace vittis quinque scutello halteribusque albis, abdominis segmentis albido marginatis, femoribus tibiisque anticis tarsisque albidis, alis albis fasciis quatuor deviis nigris.

Male. Black, smooth, shining. Head and thorax with stout black bristles. Head white; frontalia piceous, slightly tapering in front; face transversely and slightly rugulose towards the epistoma. Proboscis pale yellowish. Palpi tawny. Antennæ tawny, nearly half the length of the face; third joint slightly tapering, full twice the length of the second; arista black, plumose. Thorax with five white stripes, one dorsal and four lateral; scutellum white. Abdomen elliptical, shorter and narrower than the thorax; hairs short, black; hind borders of the segments whitish. Tarsi, fore tibiæ and fore femora whitish, the latter blackish-shaded. Wings white, with four irregular black bands; first band narrow near the base; second broad, connected in the middle with the third, which emits a costal streak to the tip; fourth abbreviated in front, dilated, and connected with the third hindward, emitting an exterior streak to the border; veins black, white at the base; discal transverse vein nearly straight, parted by less than one-third of its length from the border, and by much less than its length from the præbrachial transverse vein; cubital and præbrachial veins slightly undulating; halteres white. Length of the body 4½ lines; of the wings 10 lines.

This species appears to connect *Helomyza* with *Poticara.*

42. HELOMYZA STELLIPLENA. *Mas.* Nigra, capite antico palpisque albidis, antennis piceis, thorace vittis quatuor cinereis, abdomine piceo segmentis albido marginatis, tarsis albidis, alis nigris punctis guttisque plurimis strigisque quatuor transversis albis, halteribus albis.

Male. Black, dull. Head whitish and shining in front. Palpi whitish. Antennæ piceous, a little shorter than the face; third joint linear, whitish at the base, more than twice the length of the second; arista plumose. Thorax with four cinereous stripes. Abdomen piceous, elongate oval, a little narrower but hardly longer than the thorax; hind borders of the segments whitish; tarsi whitish. Wings black, blackish hindward, with numerous white points and dots; two transverse white costal streaks, one beyond the middle, the other subapical; two short irregular white transverse lines between the discal transverse vein and the border; veins black; discal transverse vein straight, parted by half its length from the border, and by very much more than its length from the præbrachial transverse vein; alulæ cinereous; halteres white. Length of the body 3½ lines; of the wings 7 lines.

Gen. SERACA, *Walk.*

43. SERACA ABBREVIATA. *Fœm.* Testacea, thorace vittis tribus scutellique apice pectoreque vittis quatuor nigris, abdominis dimidio postico nigro apice testaceo, femoribus posticis piceis, alis nigris spatio postico maculaque subapicali cinereis.

Female. Testaceous. Head with black bristles. Antennæ much less than half the length of the face; third joint longer than the second; arista bare. Thorax with three black stripes; scutellum with a black tip. Pectus with two black stripes on each side. Abdomen fusiform, a little longer and narrower than the thorax; apical half black; tip testaceous, acuminated. Hind femora piceous. Wings black, cinereous on a little more than half the length from the base, and on a little more than half the breadth from the hind border; a cinereous spot on the hind border towards the tip; veins black; discal transverse vein straight, parted by half its length from the border, and by more than its length from the præbrachial transverse vein; halteres pale testaceous. Length of the body 5 lines; of the wings 10 lines.

Gen. TENDEBA, n. g.

Mas. *Corpus* robustum, non setosum. *Frons* plana; facies subimpressa. *Palpi* parvi. *Antennæ* brevissimæ; articulus 3^{us} rotundus, minimus; arista subpubescens. *Scutellum* conicum, productum. *Abdomen* longi-ovatum, thorace brevius et angustius. *Pedes* robusti, nudi. *Alæ* latiusculæ.

Male. Body robust, without hairs and bristles. Head as broad as the thorax; front flat; face slightly impressed; mouth very small. Palpi small. Antennæ extremely short; third joint round, extremely small; arista minutely pubescent. Thorax with a prominent conical scutellum. Abdomen elongate oval, shorter and much narrower than the thorax. Legs stout, bare. Wings rather broad; subcostal vein ending at somewhat before half the length of the costa; radial vein ending at some distance from the tip of the wing; cubital vein ending at the tip; præbrachial vein hardly bent forward; hinder veins obsolete; discal transverse vein straight, parted by nearly twice its length from the border, and by more than twice its length from the præbrachial transverse vein.

This genus is allied to *Orygma* and to *Cœlopa*, and its structure indicates that it also has burrowing habits and that its flight is weak.

44. TENDEBA TESTACEA. *Mas.* Pallide lutea, pubescens, alis limpidis costa exteriore apiceque fuscescentibus.

Male. Pale luteous, minutely pubescent. Head a little paler than the thorax. Wings limpid, tinged with brown along the exterior part of the costa and about the tips; veins black, pale luteous at the base. Length of the body 2½ lines; of the wings 6 lines.

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Subfam. ORTALIDES, *Haliday*.

Gen. LAMPROGASTER, *Macq*.

45. LAMPROGASTER BISPINOSA. *Mas.* Testacea, frontalibus et facialibus nigro-piceis, scutello bispinoso, abdomine purpureo basi testaceo, alis cinereis apud costam fulvescentibus, vena transversa nigricante nebulosa.

Male. Testaceous, with black pubescence. Head whitish about the eyes; frontalia and facialia blackish piceous; face with a deep cavity on each side for the antenna. Antennæ less than half the length of the face; third joint fusiform, more than twice the length of the second; arista bare. Thorax with a few black bristles on each side; scutellum with two stout spines. Abdomen purple, short oval, testaceous towards the base, shorter and broader than the thorax. Wings cinereous, with a tawny tinge along the costa; veins tawny; discal transverse vein oblique, slightly bent inward towards the hind end, parted by hardly one-fourth of its length from the border, and by very much more than its length from the præbrachial transverse vein, which is blackish and clouded. Length of the body 7 lines; of the wings 14 lines.

46. LAMPROGASTER OCHROMYOIDES. *Mas.* Ochracea, capite argenteo frontalibus nigris, abdominis dimidio apicali piceo, tibiis tarsisque nigris, alis cinereis venis fusco marginatis.

Male. Dull ochraceous, not pubescent. Head silvery white; frontalia black, linear. Eyes bare. Proboscis very short. Palpi long, subclavate. Antennæ nearly as long as the face; third joint linear, rounded at the tip, thrice the length of the second; arista black, bare. Thorax with a few black bristles on each side. Abdomen oval, a little longer than the thorax; apical half piceous. Legs very robust; femora with minute black spines beneath; tibiæ and tarsi black. Wings cinereous; veins black, bordered with brown, ochraceous towards the base; præbrachial vein abruptly curved towards the cubital vein, which it joins at some distance from the tip of the latter; discal transverse vein straight, parted by one-fourth of its length from the border, and by more than its length from the præbrachial transverse vein; alulæ very large, dingy whitish, ochraceous-bordered. Length of the body 4½ lines; of the wings 9 lines.

This species may form a new genus. It differs from *Lamprogaster* in the structure of the mouth and of the wing-veins. The latter character indicates that its flight is powerful. The transverse suture of the thorax is as complete as that of the *Tachinides*, and it resembles that subfamily in the large size of the alulæ.

Gen. ACHIAS, *Fabr.*

47. ACHIAS BRACHYOPHTHALMA. *Fœm.* Testacea, vertice ochraceo fascia atomaria nigra antice excavata, facie albida piceo marginata strigis duabus lateralibus nigris, antennis fulvis, thorace vittis quatuor abbreviatis piceis, scutello nigro, abdomine segmentorum marginibus posticis styloque apicali piceis, tibiis tarsisque nigris, alis cinereis vitta costali fusca lurido varia.

Female. Testaceous, broad, thick. Head a little broader than the thorax; vertex ochraceous, with a black speckled band which is excavated in front; face whitish, bordered with piceous; facialia very broad; two black exterior lanceolate streaks. Eyes very prominent. Antennæ tawny; third joint linear, more than twice the length of the second; arista plumose. Thorax with cinereous tomentum and with four piceous stripes, of which the inner pair are most abbreviated; scutellum black. Abdomen oval, hardly longer than the thorax, with a slender apical piceous style; hind borders of the segments piceous. Tibiæ and tarsi black. Wings cinereous, with a brown partly lurid costal stripe; veins black; discal transverse vein almost straight, parted by one-fourth of its length from the border, and by much more than its length from the oblique black-clouded præbrachial transverse vein. Length of the body 6 lines; of the wings 12 lines.

This species exhibits the transition between *Achias* and *Lamprogaster*, if it does not obliterate the distinction between the two genera.

48. ACHIAS VENUSTULA. *Mas.* Fulva, capite testaceo macula rotunda nigra, oculis extantibus, abdomine viridi cupreo purpureoque micante basi subtusque testaceo, tarsis nigris, alis limpidis vena transversa discali fusco nebulosa.

Male. Tawny. Head pale testaceous, a little broader than the thorax, with a round black spot between the eyes; face deeply impressed on each side for the reception of the antennæ; epistoma prominent. Eyes very prominent. Antennæ nearly as long as the face; third joint lanceolate, four times the length of the second; arista plumose. Pectus pale testaceous. Abdomen green, tinged with cupreous and with purple, pale testaceous beneath and at the base, a little broader and longer than the thorax. Legs pale yellow; tarsi black. Wings limpid; veins black, pale testaceous towards the base; discal transverse vein straight, clouded with brown, parted by less than one-sixth of its length from the border, and by much more than its length from the oblique clouded præbrachial transverse vein; halteres pale testaceous. Length of the body 4½ lines; of the wings 8 lines.

Gen. PLATYSTOMA, *Latr.*

49. PLATYSTOMA BREVIS. *Mas.* Nigra, brevis, crassa, capite apud oculos lineis duabus transversis guttisque duabus albidis, thorace callis humeralibus albidis vittis tribus cinereis postice obsoletis, abdominis segmentis albido marginatis, tarsis albis, tibiis anticis subdilatatis, alis albidis maculis plurimis transversis fasciisque duabus nigricantibus.

Male. Black, broad, short, stout. Head whitish about the eyes; hind border of the vertex and fore border of the front and two dots between the eyes whitish; face shining; epistoma slightly retuse, whitish-bordered. Antennæ much shorter than the face; third joint nearly linear, about twice the length of the second, which is piceous; arista slightly plumose. Thorax with two whitish humeral calli and with three slender cinereous stripes, which are obsolete hindward. Abdomen oval, a little shorter and narrower than the thorax; hind borders of the segments whitish. Legs short, stout; tarsi white; fore tibiæ slightly dilated and fringed, with a whitish protuberance on the inner side. Wings whitish, with numerous blackish transverse spots which form incomplete bands; subapical band and apical band entire, the former including the discal transverse vein; veins black; discal transverse vein straight, parted by one-third of its length from the border, and by twice its length from the præbrachial transverse vein; halteres whitish. Length of the body 4½ lines; of the wings 9 lines.

50. PLATYSTOMA INSCRIPTA. *Mas.* Nigricans, capite guttis lateralibus cinereis fascia nigra, antennis rufis arista alba, thorace vittis quatuor angulosis cinereis, pectore vittis sex cinereis, abdominis segmentis cano marginatis apice rufescente, pedibus flavis tibiis nigro bimarginatis, alis albidis guttis plurimis nigricantibus, halteribus albidis.

Male. Blackish. Head with cinereous dots along each side between the eyes, whitish behind; a black shining band between the antennæ; face short, with cinereous dots; epistoma prominent. Antennæ red, shorter than the face; third joint round, longer than the second, black above in front; arista white, stout, full thrice the length of the third joint. Thorax with four cinereous zigzag partly connected stripes. Pectus with six incomplete cinereous stripes. Abdomen a little shorter than the thorax, with a hoary band on each segment; tip reddish, shining. Legs yellow; tibiæ with two black bands; tarsi black towards the tips. Wings whitish, with very numerous blackish dots, some of which form three incomplete exterior bands; veins black, pale yellow at the base; discal transverse vein straight, very oblique, parted by less than one-fourth of its length from the border, and by much more than its length from the præbrachial transverse vein; halteres whitish. Length of the body 4 lines; of the wings 8 lines.

51. Platystoma devocata. *Mas.* Nigra, capite albido macula furcata gutta maculisque duabus anterioribus nigris, palpis albis, antennis albidis basi supra nigris, thorace vittis quinque cinereis, scutello abdominisque segmentis albido marginatis, tarsis albis, alis nigricantibus apice cinereis fasciis guttularibus albis, halteribus albidis.

Male. Black, dull. Head whitish; a black spot on the vertex, forked in front, and a black dot above the base of the antennæ; face with a black spot on each side. Palpi white. Antennæ whitish, black above towards the base, much shorter than the face; third joint conical; arista plumose. Thorax with five cinereous stripes, and with a whitish callus on each side; scutellum with a whitish border. Abdomen oval, shining, a little shorter and narrower than the thorax; hind borders of the segments whitish. Femora with whitish tips; tarsi white, with black tips. Wings blackish, cinereous towards the tips, with many white dots which form three incomplete bands; one complete exterior white band; veins black; discal transverse vein straight, parted by one-fourth of its length from the border, and by much more than its length from the præbrachial transverse vein; halteres whitish. Length of the body 2½ lines; of the wings 5 lines.

52. Platystoma diminutiva. *Fœm.* Nigro-cinerea, capite antennisque rufescentibus, abdomine stylo tenui apicali, tibiis pallide flavis, tarsis basi albis, alis nigricantibus fasciis guttularibus albidis.

Female. Cinereous black. Head reddish, a little broader than the thorax; face short; epistoma flat. Proboscis retracted. Antennæ reddish, shorter than the face; third joint linear; arista bare, very slender, a little longer than the third joint. Abdomen narrower and a little longer than the thorax, with a slender apical style. Legs blackish; tibiæ pale yellow, with black tips; tarsi white towards the base. Wings blackish, with numerous minute whitish dots which form incomplete bands; veins black; discal transverse vein curved outward, parted by less than one-third of its length from the border, and by nearly twice its length from the præbrachial transverse vein. Length of the body 2 lines; of the wings 3 lines.

Gen. DACUS, *Fabr.*

53. **DACUS SPECULIFER.** *Mas.* Niger, capite luteo guttis quatuor nigris, thorace vittis duabus approximatis cinereis, callis vittis duabus lateralibus scutelloque flavis, abdomine fascia flavescente, pedibus luteis, alis limpidis strigis duabus basalibus plagaque maxima quadriguttata nigricantibus, halteribus albidis.

Male. Black. Head pale luteous, with two black dots on each side between the eyes; face short, with a black dot on each side. Antennæ piceous, much longer than the face; third joint linear, much longer than the second; arista slender, bare. Thorax with two nearly contiguous cinereous stripes; humeral calli, two hindward lateral stripes, four pectoral calli, and scutellum yellow. Abdomen short oval, shorter and a little broader than the thorax, with a yellowish band before the middle. Legs pale luteous. Wings limpid, with two blackish basal streaks, of which the hind one extends to the hind border, and the fore one is connected with a very large blackish patch; this occupies more than two-thirds of the costa, is dilated twice to the hind border, and contains two limpid dots and two exterior limpid points; veins black; discal transverse vein oblique, parted by one-fourth of its length from the border, and by rather less than its length from the oppositely oblique præbrachial transverse vein; halteres whitish. Length of the body 4½ lines; of the wings 9 lines.

54. **DACUS BIARCUATUS.** *Mas.* Niger, capite fulvo guttis quatuor nigris, thorace callis strigis duabus scutelloque flavis, pedibus piceis tarsis flavis, alis albidis strigis duabus basalibus plagaque maxima strigam emittente fuscis, halteribus flavescentibus.

Male. Black. Head tawny, shining, with a black dot on each side of the vertex, and a larger black dot on each side of the face. Antennæ slender, piceous, much longer than the face; third joint linear, as long as the first and second together; arista very slender. Thorax with four yellow calli; two humeral; one near the base of each wing, extending to the pectus; a yellow streak on each side hindward; scutellum yellow, with two minute protuberances on the hind border. Abdomen elongate oval, not shorter and hardly narrower than the thorax. Legs piceous; tarsi yellow, darker towards the tips; anterior tibiæ partly yellow. Wings whitish, lurid along the basal part of the costa; two brown basal streaks, one proceeding to the hind border, the other contiguous to a very large brown patch, which is excavated at the base, joins the hind border, extends along the costa to the tip of the wing, and emits a streak to the border behind the tip; veins black; discal transverse vein undulating, parted by one-fourth of its length from the border, and by a little less than its length from the oblique præbrachial transverse vein; halteres yellowish. Length of the body 4½ lines; of the wings 8 lines.

55. Dacus lateralis. *Mas.* Niger, capite thorace vittis quatuor pectoreque vittis duabus flavis, abdominis spatio medio testaceo vitta nigra, pedibus halteribusque flavis, femoribus posterioribus nigricanti fasciatis, alis nigris basi cinereis.

Male. Black. Head pale yellow. Antennæ black. Thorax with four yellow stripes; inner pair much shortened in front. Pectus with two yellow stripes. Abdomen oval, compressed towards the tip, a little broader but not longer than the thorax; middle part dingy testaceous, with a black stripe. Legs yellow; posterior femora with a broad blackish band. Wings black, cinereous towards the base, the latter hue prevailing most along the hind border; veins black; discal transverse vein straight, parted by much less than its length from the border, and by twice its length from the præbrachial transverse vein; halteres pale yellow. Length of the body 3½ lines; of the wings 6 lines.

56. Dacus varialis. *Fœm.* Nigro-cyaneus, capite nigro facie flava, antennis fulvis, abdomine fasciis duabus albidis, pedibus piceis tarsis posterioribus albidis, alis cinereis gutta subcostali apiceque nigricantibus vena discali transversa nigricanti nebulosa, halteribus albis.

Female. Blackish blue. Head black, with whitish tomentum behind and about the eyes; face yellow; epistoma piceous. Proboscis piceous. Palpi yellow. Antennæ tawny, a little longer than the face; third joint slightly tapering, four times longer than the second; arista bare, slender. Pectus with whitish tomentum. Abdomen fusiform, much longer than the thorax, with two whitish bands, tapering towards the tip; oviduct exserted. Legs piceous, white at the base beneath; femora paler towards the tips; posterior tarsi whitish, piceous towards the tips. Wings cinereous, blackish towards the tips; a blackish spot at the end of the subcostal vein; veins black; discal transverse vein blackish-clouded, slightly curved inward, parted by half its length from the border, and by somewhat less than twice its length from the præbrachial transverse vein; halteres white. Length of the body 5 lines; of the wings 9 lines.

Gen. Ortalis, *Fallén.*

57. Ortalis contigua. *Fœm.* Nigra, palpis albis, antennis piceis subtus albidis, thorace cyaneo, tarsis albis, alis albis plaga basali fasciisque tribus nigris, fascia 1ª strigam albam costalem includente, 3ª excavata, halteribus albis.

Female. Black, shining. Head dull, whitish about the eyes. Palpi white. Antennæ piceous, whitish beneath, nearly as long as the face; third joint linear, twice the length of the second; arista plumose. Thorax dark blue. Abdomen conical, shorter and narrower than the thorax. Tarsi white, with black tips. Wings white, with a basal black patch and with three black bands; first band very broad, containing a white costal streak; second of equal breadth; third irregular, apical, excavated, paler than the others; veins black; discal transverse vein straight, parted by more than half its length from the border, and by much more than its length from the præbrachial transverse vein; halteres white. Length of the body 2 lines; of the wings 4 lines.

58. ORTALIS SEMIVITTA. *Fœm.* Nigra, capite rufo, antennis rufescentibus, pedibus piceis tarsis fulvis, alis albis vitta costali extus dilatata guttam albam includente fasciaque exteriore strigam costalem emittente nigris, halteribus albidis.

Female. Black, shining. Head red, whitish about the eyes. Antennæ reddish, as long as the face; third joint lanceolate, four times the length of the second; arista very minute, pubescent. Abdomen elongate oval, acuminated, a little longer than the thorax. Legs piceous; tarsi tawny. Wings white, with a black costal stripe, which widens from the base to half the length, where it concisely terminates; a white costal dot near the end of the stripe; an exterior black band, parallel to the end of the stripe, emitting a costal streak to the tip; veins black; discal transverse vein straight, parted by less than one-fourth of its length from the border, and by a little more than its length from the præbrachial transverse vein; halteres white. Length of the body 2½ lines; of the wings 4 lines.

Gen. TRYPETA, *Meigen.*

59. TRYPETA DIVERSATA. *Fœm.* Pallide testacea, abdomine ovato brevi, alis nigris longis vitta postica nigricanti subnebulosa lituraque costali cinereis.

Female. Pale testaceous. Head as broad as the thorax; vertex with some black bristles; epistoma slightly prominent. Antennæ much shorter than the face; third joint linear, about twice the length of the second; arista bare. Thorax with black bristles on each side. Abdomen oval, much shorter and a little broader than the thorax. Fore tibiæ with black bristles. Wings black, long; a cinereous stripe along the hind border, partly and slightly clouded with blackish; a minute cinereous costal mark at a little beyond the middle; veins black; discal transverse vein straight, parted by hardly half its length from the border, and by much less than its length from the præbrachial transverse vein. Length of the body 2½ lines; of the wings 7 lines.

60. TRYPETA BREVIVITTA. *Fœm.* Cinereo-testacea, thorace vittis duabus fuscis, abdomine piceo lanceolato vitta abbreviata albida, pedibus albido-testaceis, alis nigris postice cinereis, halteribus albidis.

Female. Pale cinereous testaceous; whitish testaceous beneath. Head a little narrower than the thorax, with some black bristles. Antennæ much shorter than the face; third joint linear, much longer than the second; arista plumose, with short hairs. Thorax with two slender brown stripes, which are remote from each other; some black bristles along each side. Abdomen piceous, lanceolate, longer than the thorax, with a whitish stripe, which does not extend to the tip. Legs whitish testaceous. Wings black, mostly cinereous along the hind border; veins black; discal transverse vein straight, parted by one-fourth of its length from the border, and by a little more than its length from the præbrachial transverse vein; halteres whitish. Length of the body 3 lines; of the wings 6 lines.

Subfam. LEPSIDES, *Walk.*

Gen. CALOBATA, *Fabr.*

61. CALOBATA TIPULOIDES. *Mas.* Nigra, gracillima, abdomine fusco subcompresso segmentis cinereo marginatis 1° et 2° postice nigro marginatis, femoribus posterioribus piceis albido marginatis, tibiis tarsisque anticis albis, alis nigricantibus basi fasciisque tribus cinereis.

Male. Black, very slender. Head full as broad as the thorax; face silvery white; epistoma very prominent. Antennæ a little longer than the face; third joint linear, twice the length of the second; arista slender, very little longer than the third joint. Abdomen brown, very slender, slightly compressed, much narrower than the thorax, and nearly twice its length; hind borders of the first and second segments black; fore borders of the segments cinereous; apical appendages attenuated. Legs slender; posterior femora piceous, with a whitish band beyond the middle; fore tibiæ and fore tarsi white. Wings blackish, cinereous at the base, and with three cinereous bands; third band subapical, broader than the others; veins black; discal transverse vein straight, parted by much more than its length from the border, and by more than twice its length from the præbrachial transverse vein. Length of the body 6 lines; of the wings 8 lines.

Subfam. PSILIDES, *Walk.*

Gen. PSILA, *Meigen.*

62. PSILA? CALOBATOIDES. *Mas et Fœm.* Testacea, capite postico attenuato, antennis basi nigro notatis, thorace vitta nigricante abbreviata, pedibus longiusculis, alis limpidis apice nigricantibus. *Mas.* Abdomine clavato. *Fœm.* Abdomine fusiformi.

Male and Female. Testaceous, very slender. Head as broad as the thorax, elongated hindward. Antennæ pale testaceous, not more than half the length of the face, with a black protuberance above at the base; third joint linear, twice the length of the second; arista black, plumose. Thorax with a blackish stripe, which does not extend to the scutellum, the latter with two long black bristles. Abdomen longer than the thorax. Legs slender, rather long. Wings limpid, blackish towards the tips; veins black; discal transverse vein straight, parted by less than one-fourth of its length from the border, and by much more than its length from the præbrachial transverse vein;

halteres pale testaceous. *Male.* Abdomen clavate. *Female.* Abdomen fusiform, keeled and attenuated at the tip. Length of the body 4½–5 lines; of the wings 8–9 lines.

63. Psila? cruciata. *Mas.* Pallide lutea, capite lituris quatuor nigris, thoracis disco antico nigro strigas duas emittente, abdomine longo cylindrico, pedibus longiusculis, tibiis tarsisque nigris, alis limpidis fusco bifasciatis apice fuscescentibus.

Male. Pale luteous, slender. Head black between the eyes, and with a black spot above the base of the antennæ; face with two black dots near the epistoma. Antennæ nearly as long as the face; third joint linear, four times as long as the second; arista slender, very minutely pubescent. Fore disk of the thorax black excepting the humeral calli, emitting two black streaks hindward. Abdomen cylindrical, much more slender than the thorax, and nearly twice its length. Legs rather long; tibiæ and tarsi black. Wings limpid, brownish towards the tips, with two brown bands; first band including the præbrachial transverse vein, abbreviated hindward; second including the discal transverse vein, abbreviated in front, bordering the apical brownish part; veins black, pale luteous towards the base, parted by one-fourth of its length from the border, and by its length from the præbrachial transverse vein; halteres pale. Length of the body 5½ lines; of the wings 10 lines.

64. Psila? basalis. *Mas et Fœm.* Testacea, verticis disco thoracis vittis duabus abbreviatis tibiisque basi piceis, abdomine piceo basi testaceo, alis cinereis striga costali transversa fasciaque subapicali puncta dua includente fuscis latis, macula costali maculaque apicali albis.

Male and Female. Testaceous, slender. Head with a few black bristles; disk of the vertex piceous. Antennæ almost as long as the face; third joint linear, four times the length of the second; arista plumose. Thorax with two piceous stripes, which are abbreviated hindward; some long black bristles on each side. Abdomen piceous, testaceous towards the base, longer and narrower than the thorax, linear in the male, fusiform in the female. Legs pale testaceous; tibiæ piceous towards the base. Wings cinereous, with a broad brown streak proceeding from the costa to the disk, and with a broad brown subapical band which contains two cinereous costal points, a white costal spot dividing the streak from the band and a white apical spot; veins black, testaceous towards the base; discal transverse vein straight, parted by hardly one-fourth of its length from the border, and by nearly twice its length from the discal transverse vein; halteres pale testaceous. Length of the body 3½–4 lines; of the wings 7 lines.

65. Psila? vittifera. *Mas.* Picea, capite testaceo, thorace vittis quatuor piceis, pedibus halteribusque albido-testaceis, alis nigris basi cinereis.

Male. Piceous, slender. Head testaceous, with some black bristles. Antennæ pale testaceous, shorter than the face; second joint black above; third elongate conical, longer than the second. Thorax with some black bristles; sides and pectus pale testaceous, each of the former with two piceous stripes. Abdomen linear, with a few short black apical hairs, a little longer and narrower than the thorax. Legs whitish testaceous; fore femora with some black bristles. Wings black, cinereous towards the base, this hue extending most along the hind border; veins black; discal transverse vein straight, parted by half its length from the border, and by almost twice its length from the præbrachial transverse vein; halteres whitish testaceous. Length of the body 2½ lines; of the wings 4 lines.

Gen. STYMBARA, n. g.

Mas. Corpus gracile. *Antennæ* epistoma fere attingentes; articulus 3^{us} linearis, 2^{o} quadruplo longior; arista brevissime pilosa. *Thorax* elongatus. *Abdomen* lineare, thorace paulo brevius et angustius. *Alæ* longissimæ, venis subcostali et mediastinali conjunctis, vena radiali valde undulata, vena cubitali subundulata.

Male. Body slender. Head and thorax with a few bristles. Head full as broad as the thorax; face vertical. Proboscis short. Palpi moderately long. Antennæ nearly as long as the face; third joint linear, about four times the length of the second; arista with very short hairs. Thorax elongate; scutellum rather large. Abdomen linear, a little shorter and narrower than the thorax. Wings very long; subcostal and mediastinal veins united; subcostal vein ending at rather beyond one-third of the length of the wing; mediastinal vein ending at somewhat beyond the middle; radial vein forming three curves, abruptly bent to the costa at a little beyond three-fourths of the length; cubital vein very slightly undulating exteriorly; discal transverse vein straight, oblique, parted by less than half its length from the border, and by less than its length from the præbrachial transverse vein.

66. STYMBARA VAGARIA. *Mas.* Pallide testacea, abdomine basi pedibus halteribusque albidis, alis cinereis guttis marginalibus indistinctis pallidioribus.

Male. Pale testaceous, whitish beneath. Abdomen towards the base and legs whitish. Wings cinereous, with indistinct paler dots along the costa and along the hind border; veins black; halteres whitish. Length of the body 2½ lines; of the wings 7 lines.

The specimen here described is injured, and its colour and markings are somewhat indefinite.

Gen. PIOPHILA, *Fallén.*

67. PIOPHILA? DISJUNCTA. *Fœm.* Nigra, capite maculis duabus chalybæis subtus flavescente, antennis piceis, pedibus flavis, tibiis

tarsisque anticis nigris, alis sublimpidis venis halteribusque flavescentibus.

Female. Black, shining. Head and thorax with some black bristles. Head yellowish beneath; disk of the vertex and of the face chalybeous. Antennæ piceous, nearly reaching the epistoma; third joint linear, elongate. Abdomen elongate oval, hardly longer than thorax. Legs yellow; fore tibiæ and fore tarsi black. Wings nearly limpid; veins and halteres yellowish; discal transverse vein straight, parted by less than its length from the border, and by much more than its length from the præbrachial transverse vein. Length of the body 1½ line; of the wings 2½ lines.

Subfam. OSCINIDES, *Fallén.*

Gen. CHLOROPS, *Meigen.*

68. CHLOROPS? CONCLUSATA. *Mas.* Nigro-fusca, capite ferrugineo, antennis fulvis, thorace pectoreque cinereo tomentosis, abdominis segmentis albido marginatis, pedibus cinerascentibus, alis cinereis, halteribus albidis.

Male. Blackish brown. Head ferruginous, with a few black bristles. Antennæ dull tawny; arista long, slender. Thorax and pectus with cinereous tomentum. Abdomen a little shorter than the thorax; hind borders of the segments whitish. Legs dingy cinereous. Wings cinereous; veins black; discal transverse vein straight, parted by nearly its length from the border, and by more than its length from the præbrachial transverse vein; halteres whitish. Length of the body 1½ line; of the wings 3 lines.

Subfam. GEOMYZIDES, *Fallén.*

Gen. DROSOPHILA, *Fallén.*

69. DROSOPHILA PINGUIS. *Mas et Fœm.* Testacea, segmentorum abdominalium marginibus pedibusque pallidioribus, alis cinereis. *Mas.* Abdomine guttis sex nigris. *Fœm.* Abdomine guttis quatuor nigris.

Male and Female. Testaceous. Head and thorax beset with long stout bristles. Antennæ much shorter than the face; third joint elliptical, about twice the length of the second. Abdomen elliptical, not longer than the thorax; hind borders of the segments pale testaceous. Legs pale testaceous, with black bristles. Wings cinereous; veins black, testaceous towards the base; discal transverse vein straight, parted by less than its length from the border, and by much more than its length from the præbrachial transverse vein. *Male.* Third, fourth, and fifth abdominal segments with a black dot on each side. *Female.* Fourth and fifth abdominal segments with a black dot on each side. Length of the body 2 lines; of the wings 3 lines.

70. DROSOPHILA DORSALIS. Pallide testacea, thoracis vitta abbre-

viata scutellique guttis duabus nigris, alis limpidis venis albidis vena costali nigra.

Pale testaceous. Head and thorax with black bristles. Antennæ much shorter than the face; third joint conical; arista plumose. Thorax with a black stripe, which is abbreviated hindward; scutellum with a black dot on each side of the tip. Wings limpid; veins whitish; costal vein black; discal transverse vein straight, parted by much less than its length from the border, and by very much more than its length from the præbrachial transverse vein. Length of the body 2½ lines; of the wings 4½ lines.

Gen. MILICHIA, *Meigen.*

71. MILICHIA MINUTA. *Mas.* Nigra, abdomine argenteo subtus piceo thorace valde latiori, alis cinereis.

Male. Black. Head with short black bristles. Eyes large. Antennæ black, much shorter than the face; third joint round; arista simple, short. Abdomen bright silvery above, piceous beneath, much broader and a little longer than the thorax. Wings cinereous; veins and halteres black; discal transverse vein straight, parted by nearly its length from the border, and by twice its length from the præbrachial transverse vein. Length of the body 1¼ line; of the wings 2 lines.

Subfam. HYDROMYZIDES, *Fallén.*

Gen. NOTIPHILA, *Fallén.*

72. NOTIPHILA UNILINEATA. *Fœm.* Fusca, capite apud oculos albido, thorace vittis quinque cinereis, abdomine fasciis late interruptis vittaque cinereis, tibiis et tarsorum articulis apice genibusque cinereis, alis cinereis apud costam apicalem obscurioribus, halteribus testaceis.

Female. Brown. Head and thorax with black bristles. Head whitish about the eyes. Antennæ brown, much shorter than the face; third joint linear, about half the length of the second; arista plumose. Thorax with five cinereous stripes. Pectus cinereous. Abdomen with a cinereous stripe, and with widely interrupted cinereous bands on the hind borders of the segments. Knees, and tips of the tibiæ and of the joints of the tarsi cinereous. Wings dingy cinereous, darker along the apical part of the costa; veins black; discal transverse vein parted by half its length from the border, and by more than twice its length from the præbrachial transverse vein; halteres testaceous. Length of the body 2½ lines; of the wings 4 lines.

73. NOTIPHILA CARBONARIA. *Mas.* Cinereo-nigra, antennis rufis apice nigris, tibiis piceis, alis nigris postice nigricanti-cinereis.

Male. Cinereous black, with black bristles. Antennæ red, black towards the tips; third joint conical; arista plumose. Abdomen elongate oval, a little longer than the thorax. Tibiæ piceous. Wings black, irregularly blackish cinereous towards the hind border; veins and halteres black; discal transverse vein straight, parted by nearly its length from the border, and by very much more than its length from the præbrachial transverse vein. Length of the body 2 lines; of the wings 3 lines.

Gen. DISCOMYZA, *Meigen*.

74. DISCOMYZA TENEBROSA. *Mas.* Nigricanti-picea, capite piceo gutta testacea, antennis nigris basi testaceis, pectore pedibusque albis, femoribus tibiisque nigro fasciatis, alis nigricantibus apud costam nigris costa valde convexa.

Male. Blackish piceous, shining. Head piceous, with a testaceous dot in front; underside and pectus white. Antennæ black, shorter than the face, testaceous at the base; third joint conical; arista plumose. Abdomen not longer than the thorax. Legs white; femora and tibiæ with black bands. Wings blackish, black along the costa, which is very convex; veins black; discal transverse vein straight, parted by more than its length from the border, and by nearly twice its length from the præbrachial transverse vein. Length of the body 1½ line; of the wings 2½ lines.

Descriptions of some New Species of Dipterous Insects from the Island of Salwatty, near New Guinea. By FRANCIS WALKER.

[Read March 3, 1864.]

Fam. MYCETOPHILIDÆ, *Haliday*.

Gen. MYCETOPHILA, *Meig*.

1. MYCETOPHILA OBSCURATA. Nigra, nitens, ore coxisque albidis, antennis basi flavescentibus, thorace subcompresso, alis cinereis apud costam nigricantibus.

Black, shining; mouth whitish; antennæ filiform, yellowish towards the base; thorax slightly compressed; legs rather long; coxæ whitish; hind tibiæ with short slender spines; hind tarsi very minutely setulose. Wings dark cinereous, blackish along the costa; veins black; radial vein ending at two-thirds of the length of the wing; cubital ending at a little in front of the tip; subapical forked before the middle; subanal and anal veins distinct, the former not forked. Length of the body 2? lines; of the wings 4 lines.

The specimen here described is mutilated; it may form a new genus.

Fam. TIPULIDÆ, *Haliday.*

Gen. LIMNOBIA, *Meig.*

2. LIMNOBIA FILIFORMIS. *Mas.* Lutescens, antennis nigris gracillimis corporis dimidio paulo longioribus, abdomine fasciis duabus dimidioque apicali nigris, pedibus nigris longis gracillimis, alis fuscis angustis.

Male. Pale luteous, shining, slender. Head and antennæ black; the latter curved upward, filiform, very slender, more than half the length of the body. Abdomen with black bands on the hind borders of the first and second segments; apical half black. Legs dark ochraceous, long, very slender; femora and tibiæ towards the tips and tarsi blackish. Wings blackish cinereous; veins black; a discal areolet; radial vein forked; first externo-medial vein not forked; one veinlet between the third externo-medial vein and the subanal vein, joining the discal areolet at a little before the middle of the latter. Length of the body 5½ lines; of the wings 12 lines.

Gen. PACHYRHINA, *Macq.*

3. PACHYRHINA COLORATA. *Fœm.* Lutea, palpis apice nigricantibus, antennis nigris basi luteis, thorace vittis tribus maculisque posticis quatuor nigris, abdomine fasciis tribus et triente apicali atris, femoribus anticis basi luteis, femoribus posticis lutescentibus apice nigris, alis subcinereis apice nigricantibus.

Female. Bright luteous. Palpi blackish towards the tips. Antennæ black, setose, luteous at the base. Thorax with three deep black stripes and with four hindward black spots; middle stripe broader in front, much longer than the others. Abdomen with three narrow deep black bands which are convex in front; apical third part deep black, chalybeous at the tip; oviduct luteous. Legs black, stout; fore femora luteous towards the base; posterior femora dingy luteous, black towards the tips. Wings slightly cinereous; tips with a blackish tinge; veins black, pale yellow at the base; stigma blackish brown. Length of the body 9 lines; of the wings 16 lines.

Gen. GYNOPLISTIA, *Westw.*

4. GYNOPLISTIA INSOLITA. *Fœm.* Nigra, capite antico ferrugineo, antennis late pectinatis, abdomine fasciis quatuor apiceque luteis, femoribus luteis apice nigris, tibiis albo fasciatis, alis cinereis vitta costali nigra maculis tribus posticis nigricantibus.

Female. Black. Head ferruginous in front. Antennæ broadly pectinated, ferruginous at the base. Abdomen with four luteous bands on the fore borders of the segments; second band narrower than the first, broader than the third; fourth very narrow; tip and oviduct luteous. Legs stout; femora luteous, with black tips; tibiæ with a broad white band near the base. Wings cinereous, with three diffuse blackish spots along the hind border; a black costal stripe, broadest towards the base and towards the tip, contiguous in the middle to a black dot; veins black. Length of the body 8 lines; of the wings 14 lines.

Fam. ASILIDÆ, *Leach.*

Subfam. ASILITES, *Walk.*

Gen. OMMATIUS, *Ill.*

5. OMMATIUS CANUS. *Mas.* Nigro-piceus, capite pectoreque albidis, facie subaurata, abdomine cinereo segmentis albido marginatis apice nigro nitente, femoribus postice halteribusque albidis, alis cinereis apice nigricantibus.

Male. Piceous black. Head and pectus with shining whitish tomentum. Head broader than the thorax; face slightly gilded; mystax composed of a few white bristles. Eyes flat in front. Proboscis and antennæ black. Thorax with cinereous-bordered sutures. Abdomen cinereous; hind borders of the segments whitish; tip black, shining. Legs black; femora whitish on the hind side except towards the tips; hind femora whitish on both sides. Wings cinereous, blackish at the tips; veins black; halteres whitish. Length of the body 5 lines; of the wings 8 lines.

Fam. MUSCIDÆ, *Latr.*

Subfam. TACHINIDES, *Walk.*

Gen. EURYGASTER, *Macq.*

6. EURYGASTER FINGENS. *Fœm.* Anthracina, capite subaurato frontalibus piceis facialibus setosis, antennis piceis articulo 3° longissimo, thorace antico cinereo, abdomine maculis duabus apicalibus elongatis albidis, alis cinereis apud costam basalem subnigricantibus.

Female. Coal-black, broad, bristly. Head pale gilded cinereous; frontalia piceous, linear; facialia beset with bristles; epistoma not prominent. Eyes bare. Antennæ piceous, extending to the epistoma; third joint linear, rounded at the tip, eight times the length of the second; arista longer than the third joint. Thorax with cinereous tomentum in front where two slender black stripes are apparent. Abdomen a little broader but not longer than the thorax, with an elongated whitish spot on each side at the tip. Wings cinereous, slightly blackish in front towards the base; veins black; præbrachial vein forming a right angle at its flexure, curved inward from thence to its tip, which is nearly contiguous to the cubital vein at some distance in front of the tip of the wing; discal transverse vein slightly bent inward near its base, parted by much less than its length from the border, and by nearly its length from the flexure of the præbrachial vein; alulæ dingy whitish. Length of the body 3½ lines; of the wings 7 lines.

Subfam. ORTALIDES, *Haliday*.

Gen. POTICARA, *Walk*.

7. POTICARA BIARCUATA. *Fœm.* Nigra, capite aurato vertice rubro frontalibus atris, antennis luteis, pectore abdomineque nigro-viridibus, femoribus flavis apice nigris, alis nigris striga basali maculis tribus costalibus striga postica exteriore maculisque duabus subapicalibus albidis.

Female. Black. Head gilded yellow, nearly as broad as the thorax; vertex deep red; front deep black; face broad, with an ochraceous mark towards the front. Antennæ luteous, not more than half the length of the face; third joint slightly tapering, full twice the length of the second; arista very delicately setulose. Thorax dull. Pectus greenish black, shining. Abdomen blackish green, fusiform, much narrower but hardly longer than the thorax. Femora, excepting the tips, and fore coxæ yellow. Wings black, in structure like those of *P. triarcuata*; a small whitish streak near the base of the costa; three triangular whitish costal spots, of which the first is very small; a whitish oblique streak beyond the middle of the hind border, and two whitish triangular spots near the tip of the latter; veins and halteres black. Length of the body 5 lines; of the wings 12 lines.

The structure of the head in this genus indicates its affinity to *Achias*; it is also allied to *Dacus* and to *Lamprogaster*.

Gen. ACHIAS, *Fabr*.

8. ACHIAS DACOIDES. *Mas.* Obscure rufa, capite flavescente dilatato fasciis duabus vittisque sex nigris, antennis piceis basi fulvis, thorace vittis tribus nigris scutello fulvo metathorace fascia albida, abdomine piceo petiolato vitta pallidiore, pedibus nigris tarsis posticis femoribusque flavis, alis cinereis vitta costali fusca, halteribus flavis apice nigris.

Male. Dark red. Head dingy yellowish, much dilated, broader by half than the thorax; two black bands on the vertex; face with two black stripes; two oblique black stripes on each side, each of the first pair forked towards the facial stripe, and thus including a small triangular yellowish dot. Antennæ piceous, tawny at the base, not extending to the epistoma; third joint tapering, full four times the length of the second; arista setulose. Thorax with three black stripes; scutellum tawny; metathorax with a whitish band. Pectus partly covered with cinereous tomentum. Abdomen petiolated, elliptical, piceous, with a paler stripe and with cinereous tomentum, much narrower and rather longer than the thorax. Legs black; femora yellow, black at the base; hind tarsi yellow, black towards the tips. Wings cinereous, with a brown costal stripe; veins black, pale yellow towards the base; discal transverse vein hardly bent inward, parted by one-fourth of its length from the border, and by more than its length

from the præbrachial transverse vein, which is oblique; halteres pale yellow, with black knobs. Length of the body 6 lines; of the wings 13 lines.

Gen. PLATYSTOMA, *Latr.*

9. PLATYSTOMA IMPINGENS. *Fœm.* Nigro-cinerea, capite albo vertice fronteque luteis vittis duabus lateralibus nigris, thorace vittis tribus canis duabusque lateralibus cinereis guttis duabus lateralibus nigris, abdomine lateribus basi tibiisque posterioribus rufescentibus, alis albidis guttis plurimis fasciisque quatuor exterioribus fuscis, halteribus testaceis.

Female. Cinereous black. Head white, narrower than the thorax; vertex and front dull luteous; face elongated, tinged with pale yellow; a broad black shining stripe on each side. Antennæ piceous, not half the length of the face; third joint piceous, about four times the length of the second, which is red; arista plumose. Thorax with three hoary stripes and with two intermediate cinereous stripes; a black dot on each of the two outer stripes. Abdomen oval, much shorter and narrower than the thorax, with some short hoary hairs, which are mostly on the hind borders of the segments; sides dull reddish towards the base. Legs black; posterior tibiæ dark reddish, except towards the tips. Wings whitish, with numerous brown dots towards the base, and with four exterior brown bands; first band irregular, partly composed of dots; second slightly guttular in front, connected on the hind border with the third, which is connected in the middle with the irregular subapical fourth band; veins black; discal transverse vein straight, parted by one-fourth of its length from the border, and by very much more than its length from the oblique præbrachial transverse vein; alulæ white; halteres testaceous. Length of the body 6 lines; of the wings 12 lines.

Gen. DACUS, *Fabr.*

10. DACUS TURGIDUS. *Mas.* Niger, capite flavo punctis duobus macula fasciaque nigris, antennis fulvis, thorace vittis quatuor halteribusque flavis, abdomine subpetiolato fascia flava, pedibus piceis femoribus sordide flavescentibus basi albidis, alis limpidis vittis duabus nigricantibus costa extus valde dilatata.

Male. Black. Head yellow, with two black points on each side between the eyes, and a black middle spot, which is forked hindward; face with a black band in front. Antennæ tawny, little more than half the length of the face; third joint elongate conical, about twice the length of the second; arista plumose. Thorax with four yellow stripes; outer pair extending to the base of each wing, and thence bent across each side of the pectus; inner pair extending along each side of the metathorax. Abdomen fusiform, subpetiolated, much longer and narrower than the thorax, with a yellow band on the fore border of the second segment. Legs piceous; fore femora dingy yellowish, slightly shaded with piceous; posterior femora whitish towards the base. Wings limpid, with two blackish stripes, one costal; the other mostly contiguous to the hind border, terminating by the discal transverse vein; costa much dilated exteriorly; veins black; discal transverse vein oblique, nearly straight, parted by one-sixth of its length from the border, and by a little less than its length from the præbrachial transverse vein, which is unusually long; halteres pale yellow. Length of the body 5 lines; of the wings 11 lines.

This species has some affinity to the genus *Poticara.*

11. DACUS DETRUDENS. *Mas.* Purpureo-cyaneus, frontalibus nigris, facie fulva nigro fasciata, palpis nigris apice fulvis, antennis piceis basi fulvis, thorace vitta cinerea, abdomine subcompresso, pedibus piceis tibiis posticis basi subtus albidis, alis cinereis, halteribus albis.

Male. Purplish blue; nearly allied to *D. varialis.* Head and pectus with cinereous tomentum. Head a little broader than the thorax; frontalia black, widening in front; face tawny, with a black band near the epistoma, which is prominent. Proboscis and palpi black, the latter tawny towards the tips. Antennæ piceous, a little longer than the face, tawny towards the base; third joint linear, full four times the length of the second; arista bare, slender. Thorax with a cinereous stripe. Abdomen linear, sessile, slightly compressed, much narrower and longer than the thorax. Legs piceous; hind tarsi whitish beneath towards the base. Wings cinereous, slightly darker towards the costa; veins black; discal transverse vein nearly straight, blackish-clouded, parted by hardly half its length from the border, and by a little more than its length from the præbrachial transverse vein; halteres white. Length of the body 4½ lines; of the wings 8 lines.

Gen. SOITA, n. g.

Mas. *Corpus* longum, gracile. *Caput* setis duabus incrassatis arcuatis. *Oculi* nudi. *Antennæ* facie longiores; articulus 3^{us} linearis, 2^{o} quadruplo longior. *Thorax* elongatus. *Abdomen* lineare, subcompressum, thorace valde longius. *Pedes* antici breves, tenues; postici longi, femoribus subincrassatis, tibiis spinosis.

Male. Body long, slender, shining, minutely pubescent. Head hardly broader than the thorax, with a few bristles, two of which on the fore part of the vertex are incrassated and curved; face short, vertical; epistoma hardly prominent. Eyes bare. Proboscis and palpi short. Antennæ longer than the face; third joint linear, four times the length of the second; arista with very short hairs. Thorax elongated, with a few bristles on each side. Abdomen linear, slightly compressed, much narrower and very much longer than the thorax. Fore legs short, slender, with slightly setose femora; middle legs moderately long; hind legs much longer, with slightly incrassated femora and spinose tibiæ. Wings moderately broad; subcostal vein ending at the middle of the costa; radial vein ending at some distance from the tip of the wing; discal transverse vein straight, parted by one-fourth of its length from the border, and by very much more than its length from the præbrachial transverse vein.

12. **Soita psiloides.** *Mas.* Pallide lutea, tibiis anticis femoribus halteribusque pallide testaceis, alis cinereis apud venas subluridis vena transversa discali fusco nebulosa.

Male. Pale luteous, with black bristles. Femora and fore tibiæ pale testaceous. Wings cinereous, slightly lurid along the veins; veins black, pale luteous towards the base; discal transverse vein clouded with brown hindward; halteres pale testaceous. Length of the body 5 lines; of the wings 8 lines.

Subfam. Hydromyzides, *Fallén.*

Gen. Notiphila, *Fallén.*

13. **Notiphila ortalioides.** *Mas.* Nigra, thorace piceo tomentoso, tarsis piceis, alis nigris lituris quatuor interioribus parvis quatuorque exterioribus majoribus transversis albis.

Male. Black. Head and thorax with some black bristles. Eyes bare. Antennæ as long as the face; third joint linear, much longer than the second; arista plumose. Thorax with piceous tomentum. Tarsi piceous. Wings black, with eight white marks; four marks minute, near the base; four exterior, larger, transverse; discal transverse vein straight, parted by half its length from the border, and by very much more than its length from the præbrachial transverse vein. Length of the body $1\frac{3}{4}$ line; of the wings 3 lines.

Facts relative to the Movements of Insects on Dry, Polished, Vertical Surfaces. By John Blackwall, F.L.S.

[Read Nov. 17, 1864.]

(Abstract.)

As objections continue to be urged against the opinion that flies and other insects of various species are enabled to move on the vertical surfaces of highly polished bodies by the emission of an adhesive fluid from the numerous hair-like papillæ distributed over the inferior surface of their pulvilli, the statement of a few plain facts for the consideration of dissentients, and especially of those who still advocate the hypothesis that flies, in such instances as those referred to above, are supported in their movements mainly by the pressure of the atmosphere, may, perhaps, be deemed deserving of attention.

Without the slightest intention to undervalue the importance of microscopic researches into the organization of the parts in question, I may be permitted to remark that the careful observation of phenomena and judiciously selected and skilfully conducted experiments afford equal if not superior advantages with regard to the determination of the function they perform; and that the two methods of investigation should be pursued contemporaneously, and, as far as opportunities will admit, in combination.

Having clearly ascertained by repeated inspections of the pulvilli of flies under the microscope, both in a state of action and repose, that a vacuum cannot possibly be formed between them and smooth surfaces to which they are applied, unless the papillæ with which they are provided separately contribute to produce such an effect, it was immediately perceived that a decisive test of the truth or fallacy of this conjecture might be obtained by means of the air-pump, and the result of its application was to demonstrate, not only that flies can traverse the upright sides and the interior surface of the dome of an exhausted receiver while their physical energy is unimpaired, but also to establish the important fact that individuals occasionally remain fixed to the sides of the glass after they have entirely lost the power of locomotion, a circumstance which admits of only one explanation, namely, that an adhesive fluid is emitted from the extremity of their papillæ. The sole suggestion hitherto advanced, which has even the appearance of at all affecting the validity of the conclusion thus arrived at, is that the specific gravity of flies is so low that a very slight degree of adhesive power is sufficient to sustain them in the position they occupy; but, low as it undoubtedly is, it greatly exceeds that of atmospheric air, and it is evident that the efficiency of the adhesive agency to support them on a polished vertical surface *in vacuo*, thus conceded, must be ample to enable them to move on the glass of our windows in perfect security, under ordinary circumstances, without the adventitious aid of atmospheric pressure; the question of specific gravity, therefore, may be safely eliminated as being of no moment in any attempt to solve this interesting physiological problem.

The argument so much relied upon by opponents is, that if flies retained their position on polished vertical surfaces by means of an adhesive fluid emitted from the hair-like papillæ on the inferior surface of their pulvilli, they would, after remaining long in one situation, be unable to quit it by any muscular effort they could employ without seriously injuring those delicate parts, in consequence of the tenacity that the fluid would acquire by desiccation; whereas it is well known that their movements are not in the least impeded by this circumstance. Plausible as this reasoning is, it appears to be based on the erroneous supposition that the properties of the fluid resemble those of animal-glue or vegetable-gum, an assumption which is at variance with all the particulars that have been ascertained in connexion with the phenomenon; in fact, the fluid merely assumes a gelatinous consistency on exposure to the atmosphere, and is readily removed from the pulvilli, when redundant, by the customary mode of cleansing those organs employed by insects, which it could not possibly be were it of the tenacity implied by the foregoing conjecture.

That flies are unable to walk on polished vertical surfaces when breathed upon till the aqueous vapour expelled from the lungs is copiously condensed thereon is an acknowledged fact; but it does not appear to be known that when thus treated they cannot even retain the position they occupy, whether they make any visible effort to do so or not, a circumstance that seems to be quite inexplicable on the hypothesis that they are supported by the agency of atmospheric pressure, but which admits of a satisfactory explanation on the principle of a solvent fluid acting upon a gelatinous and moderately adhesive animal secretion; and these remarks apply to numerous species of insects, and also to spiders provided with scopulæ; but the latter, when they perceive their footing to be insecure, frequently attach themselves to the spot by emitting from their spinners a little of the viscid material of which their silken lines are formed that possesses the property of being insoluble in water.

In spring, summer, and autumn house-flies may frequently be seen adhering so firmly to the upright surface of the glass of windows that they are incapable of extricating themselves though they make every exertion to accomplish that object, yet, when breathed upon till the aqueous vapour exhaled is condensed about them, they speedily fall from the spot to which they were previously attached so strongly. Now that this remarkable affection of the house-fly cannot be caused solely by a low state of atmospheric temperature, as it has been surmised, is evident from the circumstance that it often occurs in the hottest period of the year; in the months of July and August 1864, upwards of twenty instances of this curious fact were noticed; it must be ascribed, therefore, either to feebleness resulting from some other cause, or to an increase in the adhesiveness of the fluid secretion emitted from the papillæ in the act of climbing. If it should still be insisted upon that the phenomenon is the result of atmospheric pressure, it behoves the advocates of that hypothesis to explain in what manner a little condensed vapour causes the liberation of insects that are unable to accomplish the act by their own unaided efforts. That an organ deemed to be capable of so entirely expelling the air from the space between its extremity and smooth surfaces with which it is brought in contact as to produce a vacuum, should yet be incompetent to effect the exclusion of so dense a fluid as water, does certainly appear to be in the highest degree improbable*.

The promptness and celerity of the movements of flies in an inverted position, or with their backs downwards, on highly polished surfaces, and the certainty with which their hold is immediately secured when they alight upon them, would seem to preclude the possibility of the employment of muscular force on such occasions adequate to the instantaneous expulsion of the air between their delicate climbing apparatus and the plain on which they move, to the extent required for the formation of an efficient vacuum; but every difficulty is at once obviated by admitting that a minute quantity of moderately adhesive fluid, which acquires a gelatinous consistency on exposure to the atmosphere, is emitted from the organs of sustentation. Unexceptionable evidence that such actually is the case has been obtained by observing that the extremity of each papilla becomes cauterized when subjected to the action of finely pulverized nitrate of silver; and that insects, when traversing a vertical surface of glass, leave upon it a visible and enduring trace of their path, for the better perception of which a lens having a high degree of magnifying power should be employed.

Though perfectly satisfied that the conclusion deduced by me from the experiment with the air-pump rests on too secure a basis to be subverted, yet a desire to remove all apparent difficulties which may be thought to militate against the view that I have promulgated of the means by which numerous species of insects and spiders, and even some reptiles, are enabled to move on dry, polished, vertical surfaces, must serve as my excuse for obtruding once more on the attention of naturalists a subject that has been the occasion of so much controversy.

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* The adhesion of flies to the glass of windows and to other surfaces, towards the end of summer and in autumn, is usually caused by the growth from the interior of the body of a parasitic fungus (*Sporendonema muscæ*, Fries; *Empusa muscæ*, Cohn).—G. B.

Further Note on a Skeleton of *Dinornis robustus*, Owen, in the York Museum. By Thomas Allis, Esq., F.L.S.

[Read Nov. 17, 1864.]

In my paper on the Dinornis read before the Society on the 16th of June, I stated that the three dorsal vertebræ immediately above the sacrum were normally anchylosed; when we mounted the skeleton we found that was not the case, and we separated all these vertebræ. It was so long since I had employed myself in comparative osteology, that I had forgotten that to have these bones anchylosed is only the normal condition of birds which possess the power of flight; having discovered the mistake, I feel it a duty to acknowledge and rectify it. We also found that we have the first phalanx of the left middle toe; we thought we wanted every bone of that toe: we further found that all the phalanges of the left outer toe, as well as part of the condyle to which they were articulated, have lost the whole of their periosteum, in consequence of their exposure to atmospheric change and influence from their near approach to the external circumference of the sand-drift in which the bird was entombed. I stated that the only figure of the Dinornis to which we had access gave the bird but two sternal ribs. Professor Owen informs me that that had been corrected in vol. iv. (pl. 46) of the 'Zoological Transactions.'

In the report of my former paper I am made to say, "that the middle cervical vertebræ had suffered from exposure above the surface of the ground." What I said, or meant to say, was, that they were so high in the sand-drift as to be within reach of the deleterious influence of the atmosphere; while the other parts of the skeleton were at a sufficient depth to be secured from its influence, with the exception of the left toe before alluded to. Had the vertebræ been above the surface, it would have been impossible for so many detached bones to have been preserved in the regular succession in which we find them; the nine cervical vertebræ we have, are evidently the lowest nine in the series.

In the cavities of the sacrum we found a good deal of impalpable sand, and there can be no doubt that the beautiful state in which most of the bones are found is mainly owing to the extreme fineness of the sand in which they were imbedded.

For the acceptance of the Society I send three more photographs; one showing the right side of the Dinornis as mounted; another showing the left side, together with a full-sized Ostrich; and another of the Cassowary, the Emu, and the Rhea. The Rhea is the only bird in the group agreeing with the Dinornis in the number of sternal ribs; the Emu and Cassowary have four each, and the Ostrich five; but in the side of the Ostrich shown on the photograph there are only four,—the dorsal rib, to which the fifth should have been attached, terminates in a point, and has no articulatory surface at the end; the sternum is equally without any articulatory surface to receive it; in the other side the bird has the normal number of five sternal ribs.

Brief notice of results obtained by Experiments with Entozoa.

By T. Spencer Cobbold, M.D., F.R.S., F.L.S.

[Read Dec. 1, 1864.]

1. *Tænia echinococcus.*—Eight separate worm-feedings with fresh Echinococcus-larvæ administered to five different dogs gave only negative results. In one instance the experimental animal, to which I had made three separate administrations, was unfortunately liberated by some ill-disposed person the evening prior to the day fixed for ascertaining the result. This dog had been sixteen weeks under observation.

2. *Tænia serrata.*—Three administrations of full-grown larvæ (*Cysticercus pisiformis*) to three separate dogs gave positive results in two instances; the third experiment being partly negatived. In all cases the administration of imperfectly developed larvæ to the same animals produced no tapeworms. The results of a fourth experiment, in three separate worm-feedings, with the dog which had been liberated, could not, of course, be ascertained.

3. *Tænia marginata.*—The administration of fresh eggs of this tapeworm to a monkey failed to develope any examples of the *Cysticercus tenuicollis.*

4. *Tænia cucumerina.*—In like manner the ova of this highly characteristic species administered to several cockroaches (*Blatta orientalis*) yielded only negative results.

5. *Fasciola hepatica.*—The deposition of the eggs of the com-

mon liver-fluke in water led to the formation of incompletely developed embryos within the space of ten weeks. At the furthest stage observed the embryos were ovoid, slightly constricted here and there, some of them displaying traces of a rudimentary eye-spot.

6. *Ascaris osculata.*—Eggs, with commencing yelk-segmentation, placed in "fresh" water developed into free embryos in less than three weeks; while those deposited in salt water required a period of six months for the completion of their development. At the expiration of twenty months the largest examples did not exceed $\frac{1}{40}$th of an inch in length.

Eggs of this nematode with segmented yelks, also eggs containing embryos, and likewise many free embryos were administered to two dogs without producing a positive effect. The same result followed their introduction into the intestinal canal of frogs and various fishes. In the case of one gold-carp, however, numerous empty egg-shells were found, testifying to the escape of the embryonic contents.

7. *Ascaris marginata.*—Immersion of the eggs of this species led to the completion of their embryonic development within the chorion at the expiration of a period of four months; nevertheless nearly seventeen months elapsed before the embryos quitted their shells.

8. *Ascaris lumbricoides.*—In this species the deposition of the ova in fresh water gave no satisfactory result. At the expiration of three months the eggs had, from some unascertained cause, lost their vitality. The egg-contents had not completed their embryonic formation.

9. *Ascaris megalocephala.*—In this closely allied form, intra-chorional embryonic development was fully perfected within the space of three months after immersion; and in less than five months many of the embryos were found to have quitted their shells.

10. *Oxyuris vermicularis.*—Eggs of the thread-worm containing the characteristic tadpole-shaped embryos failed to liberate their contents either in water, in decaying fruit, or in other vegetable matters, although retained in these media for several months. The experiments were several times repeated, but, in all cases, the ova perished. In like manner, the administration of the eggs of this species, with their contained embryos, in one case to a monkey, and in another to a goat, yielded only negative results.

11. *Strongylus armatus.*—As in the case of the common human

Ascaris, the eggs of this parasite perished in less than four months after their immersion in water. During the interval the jar had been upset and most of its contents lost.

12. *Prosthecosacter inflexus.*—The ova of this viviparous species continued to develope their contents after deposition in water, the embryos displaying signs of growth during a period of several weeks subsequent to their escape from the chorional envelope.

A List of Diurnal Lepidoptera collected by Mr. Wallace in the Eastern Archipelago. By W. C. Hewitson, Esq., F.L.S.

[Read Dec. 15, 1864.]

The very valuable collections of Satyridæ, Erycinidæ, Lycænidæ, and Hesperidæ amassed by the indefatigable industry of Mr. Wallace having been transferred to my keeping, I am happy to comply with his wishes by compiling a list of the species, with notice of all their varieties and localities.

Fam. SATYRIDÆ.

Gen. Debis, *Boisduval.*

Debis Isana, *Kollar, in Hugel's Reise,* pl. 16. figs. 3, 4. Java.

Debis Europa, *Fabricius.* Java.

Var. Arete, *Cramer,* ♂. Bouru; Macassar; Amboyna.

Females with the transverse band of the anterior wing broader, more irregular, and less clearly defined on its outer border than in the figures of Cramer and Hübner. Bourou.

Debis Arcadia, *Cramer,* pl. 116. Bali; Sumatra.

Debis Mekara, *Moore.* Sumatra.

Gen. Cyllo.

Cyllo Lowii, *Doubleday & Hewitson, Gen. Diurn. Lep.* pl. 61. fig. 4. Sarawak; Sumatra.

Cyllo amabilis, ♀, *Boisduval, Voy. Astrolabe,* pl. 2. figs. 1, 2.

Male with the transverse band of the anterior wing ochreous yellow. Bouru; New Guinea; Dorey; Amboyna.

Var. *Male and female.* With the transverse band narrower; the eyes on the underside of the posterior wing much larger. Ceram.

Cyllo Constantia, ♀, *Cramer,* pl. 133. Dorey; Amboyna.

Male. Above differs from the female only in having the transverse band more rufous and nearer to the apex, the underside darker, with the eyes of the posterior wing much larger and more distinct.

Var. *Male.* With the transverse band much narrower, ill-defined, and clouded. Amboyna; Mysol.

Var. *Male.* With the transverse band obscured and scarcely seen; the eyes on the underside of the posterior wing smaller. Aru; Batchian; Salwatty.

Cyllo Leda, *Linnæus.*

C. Banksia, *Fabr.* C. Helena, *Westwood.* M. Vamana, Ambasara, Bela, Sugudana, Varaha, Gokala, and Suradeva, *Horsf. & Moore, Cat. Lep. E. I. C.* pp. 223, 224. C. Atrax, Erichsonia, and Boisduvalia, *Felder.*

Specimens (males) resembling the figures 3 & 4, *Oreas marmorea Leda* (C. Helena, *Westw.*), of Hübner's Sammlung, which I believe represent the male. From Bouru, Timor, Batchian, Ceram, Waigiou. Females of the above with the wings truncate, paler, and more ochreous on both sides, resembling Cramer's fig. A. pl. 292. From Bouru, Batchian, and Gilolo.

Specimens of both sexes resembling figs. 1, 2, *Oreas marmorea Leda,* of the same plate of Hübner's Sammlung. From Timor, Flores, Sumatra, and Singapore.

Specimens of both sexes resembling fig. B of Cramer, pl. 292. From Amboyna, Tondano, and Java.

One specimen (male) exactly resembling the first-described (Hübn. Samml. figs. 3, 4) on the upperside, and on the underside as much like the other figures 1 & 2 of the same plate but without any of the ocelli. From Tondano.

Specimens of *Suradeva,* Moore, from Java and Malacca.

I feel sure that any one who will sit down with a large series of *Cyllo Leda* and *C. Banksia* before him, and unprejudiced by what has been done before, must come to the same conclusion which I have done, that they and their endless varieties are one and the same species. I cannot find any line of demarcation by which to make a satisfactory separation. Both of them vary in contour from the triangular anterior wing with its pointed apex and straight outer margin to the same wing truncated at the apex and projected in some cases to a point below the apex. Both have and are also without the ocelli of the underside, which has hitherto been the chief characteristic of *Cyllo Leda.* I believe that *C. amabilis* and *C. Constantia* might be better placed as varieties of this species.

Gen. Cœlites, *Westwood.*

Cœlites Epiminthia, *Westwood, in Doubleday & Hewitson's Gen. Diurn. Lep.* p. 368.

Gen. Ragadia, *Westwood.*

Ragadia Crisia, *Hübner, Zutr.* figs. 675, 676. Sumatra; Java; Sarawak; Singapore.

Gen. Erites, *Boisduval.*

Erites Madura, *Horsfield, Cat. Lep. E. I. C.* p. 5. figs. 8, 8 *a.*

Var. *Male and female.* With five ocelli on the anterior wing, one large and four small. Sumatra; Singapore.

Var. *Male and female.* With the five ocelli of the anterior wing small and of equal size. Singapore; Sarawak.

This genus differs very slightly from *Euptychia.*

Gen. Mycalesis, *Hübner.*

Mycalesis Doricus, ♀, *Boisduval*; *Hewitson, Ex. But.* iii. Mycalesis, ii. figs. 7–10. Males with the anterior wing uniform dark brown. Waigiou; Aru.

Var. *Male.* With the orange band on the anterior wing as in the female. New Guinea; Mysol; Dorey.

Var. *Male.* Of a paler brown; the lower ocellus of the anterior wing bordered with yellow above as well as outwardly; the outer half of the posterior wing orange-yellow, and like that of the female without the brown border. The underside much paler, almost white. Aru.

Mycalesis Mucia, *Hewitson, Ex. But.* iii. Mycalesis, ii. figs. 11, 12. Aru.

Mycalesis Messene, *Hewitson, Ex. But.* iii. Mycalesis, ii. figs. 8, 9. Morty; Gilolo; Ternate; Batchian.

Mycalesis Cyamites, *Boisduval, Voy. Astrolabe*, p. 152. New Guinea; Dorey.

Mycalesis Mehadeva, ♂, *Boisduval, Voy. Astrolabe*, p. 151. Dorey.

Var. *Male.* With the ocellus of the anterior wing obscured by black. New Guinea; Mysol.

Var. *Male.* With more than half of the anterior wing black; the underside much darker and beautifully tinted with purple. Waigiou.

Female paler brown; the anterior wing with two ocelli, one near the apex scarcely seen, the other surrounded by a large spot of orange; posterior wing with more than the outer half orange, with one ocellus as in the male; the underside paler, without any of the lilac tint of the male. New Guinea.

Mycalesis Remulia, *Cramer*, pl. 237. Amboyna; Ceram; Mysol; Bouru; Waigiou; Salwatty; Batchian; Gilolo; Ternate; Morty Island.

Mycalesis Asophis, ♂, *Hewitson, Ex. But.* iii. Mycalesis, iv. figs. 20, 21. New Guinea; Waigiou; Mysol.

Var. *Male.* With the wings all dark brown; the posterior wing with four ocelli. Salwatty.

Female larger, paler brown; both wings rufous brown to the middle, much paler beyond the middle, the ocelli larger; the posterior wing with four, five, or six ocelli, three or four of which are small and obscure. New Guinea; Aru; Mysol.

MYCALESIS PHIDON, ♂, *Hewitson, Ex. But.* iii. Mycalesis, iii. fig. 16. New Guinea; Aru; Mysol; Waigiou.

Female like the male, except that it is larger and of a much paler brown, and that the posterior wing has five ocelli. New Guinea.

MYCALESIS DEXAMENUS, *Hewitson, Ex. But.* iii. Mycalesis, iii. figs. 17, 18 (not 19). Tondano.

Var. *Female.* Without the black eye-like spot of the anterior wing; the underside much darker. Tondano.

MYCALESIS DORA, *Hewitson.*

Mycalesis Deianira, ♂, *Hewitson, Ex. But.* iii. Mycalesis, iii. fig. 13. Tondano.

Female. Like the male, except that it is larger, more obscure, with the whole of the posterior wing rufous brown. Sulla.

I have renamed this species, *Deianira* spelt "*Dejanira*" having been used before.

MYCALESIS DINON, ♀, *Hewitson, Ex. But.* iii. Mycalesis, iii. fig. 31.

Mycalesis Dexamenus, var., *Hewitson, Ex. But.* iii. Mycalesis, iii. fig. 19. Macassar.

I believed this species to be only a variety of *Dexamenus* until I obtained the male in Mr. Wallace's collection; the sexes are both alike.

MYCALESIS MAIANEAS, *Hewitson, Ex. But.* iii. Mycalesis, v. figs. 27, 28. Malacca; Sarawak.

MYCALESIS MYNOIS, *Hewitson, Ex. But.* iii. Mycalesis, v. figs. 29, 30. Timor.

MYCALESIS ANAPITA, *Horsfield & Moore, Cat. Lep. E. I. C.* p. 232. Sumatra; Sarawak.

MYCALESIS DINICHE, ♂, *Hewitson, Ex. But.* iii. Mycalesis, iv. fig. 23. Sumatra; Singapore; Sarawak.

Female. Like the male, but larger and much paler.

MYCALESIS MANIPA, *Boisduval, Voy. Astrolabe,* p. 150.

Mycalesis Daidis, *Hewitson, Ex. But.* iii. Mycalesis, iv. fig. 22. Bouru; Ceram; Sulla.

Female. Like the male, except that it is larger and has a distinct transverse band at the middle, and the outer margin much paler and the small ocelli more distinct.

MYCALESIS JOPAS, *Hewitson, Ex. But.* iii. Mycalesis, iv. fig. 24. Macassar; Tondano; Sulla.

MYCALESIS HESIONE, ♂, *Cramer,* pl. 11. 362. Macassar; Timor; Bouru; Sumatra; Sarawak; Flores; Morty.

Female. Like the male, except that it is a little larger and of a pale brown.

MYCALESIS LALASSIS, *Hewitson, Ex. But.* iii. Mycalesis, vi. fig. 35. Amboyna; Singapore; Gilolo; Flores; Sulla.

MYCALESIS MINEUS, *Linn., Cramer.*

♂. M. Justina, *Cram. Pl.* 326. ♀. M. Drusia, *Cram. Pl.* 84. Macassar; Sumatra; Singapore.

The butterfly which I have described under the name of *M. Lalassis* may be only a variety of this species. I have thought it best to confine *M. Mineus* to the description of Linnæus, who says that the underside of the anterior wing has two ocelli, rather than allow it, as Godart does, to have four or five. It is true that when restricted to two ocelli these have sometimes two or three more minute immature ocelli attached to them. Except in *M. Polidecta* (the aberrant species of this genus) it will be best to allow but little variation for the ocelli.

MYCALESIS MEGAMEDE, *Hewitson, Ex. But.* iii. Mycalesis, iii. fig. 14. Macassar; Gilolo; Batchian; Ternate; Sumatra; Malacca; Java.

Var. *Male.* With the underside pale, rufous, the ocelli larger and very black, the fifth ocellus of the anterior wing conspicuously large. Sulla.

This species may be readily known from all those most nearly allied to it by the undulated underside.

MYCALESIS OROATIS, *Hewitson, Ex. But.* iii. Mycalesis, vi. figs. 38, 39. Java.

MYCALESIS NALA, *Felder, Wien. Ent. Monats.* (1859) iii. p. 403.

Mycalesis Mamerta, *Horsfield & Moore, Cat. Lep. E. I. C. Museum,* p. 231 (not Mamerta of *Cramer*).

MYCALESIS MNASICLES, *Hewitson, Ex. But.* iii. Mycalesis, v. figs. 32, 33. Sumatra.

Gen. HYPOCYSTA, *Westwood.*

HYPOCYSTA OSYRIS, *Boisduval; Felder, Wien. Ent. Monats.* iv. pl. 3. New Guinea; Aru; Mysol.

HYPOCYSTA HÆMONIA, *Hewitson, Ex. But.* iii. Satyridæ, fig. 1. Aru.

HYPOCYSTA HYGEA, *Hewitson, Ex. But.* iii. Satyridæ, figs. 2, 3. New Guinea; Aru; Dorey; Salwatty.

HYPOCYSTA HECAERGE, *Hewitson, Ex. But.* iii. Satyridæ, figs. 4, 5. New Guinea.

Gen. ACROPHTALMIA, *Felder.*

ACROPHTALMIA ARTEMIS, *Felder, Wien. Ent. Monats.* v. p. 305. Batchian; Gilolo; Morty; Menado; Sulla.

Gen. YPHTHIMA, *Hübner.*

YPHTHIMA BALDUS, *Fabricius, Ent. Syst.* iii. p. 323. Singapore; Sumatra.

Var. With the underside much paler. Macassar.

YPHTHIMA FASCIATA, *Hewitson, Trans. Ent. Soc.* 3rd series, ii. p. 287. Sumatra.

YPHTHIMA LORYMA, *Hewitson, Trans. Ent. Soc.* 3rd series, ii. pl. 18. figs. 16, 17. Macassar; Sarawak.

YPHTHIMA PANDOCUS, *Horsf. & Moore, Cat. Lep. E. I. C. Museum,* p. 235 = *Hewitson, Trans. Ent. Soc.* 3rd series, ii. pl. 18. fig. 12. Java; Sarawak; Macassar.

YPHTHIMA PHILOMELA, *Hübner, Zutr.* figs. 83, 84. Malacca.

YPHTHIMA APHNIUS, *Godart, Enc. Méth.* p. 551; *Hewitson, Trans. Ent. Soc.* 3rd series, ii. pl. 17. figs. 8, 9. Timor.

YPHTHIMA SEPYRA, *Hewitson, Trans. Ent. Soc.* 3rd series, ii. pl. 17. fig. 10. Batchian; Gilolo.

Var. With the underside of the posterior wing white, slightly undulated with rufous brown. Flores.

YPHTHIMA ARCTOUS, *Fabricius.* Aru.

YPHTHIMA AMPHITHEA, *Ménétries, in Schrenck's Amur-Lande,* pl. 3. fig. 10. Sula.

Fam. ERYCINIDÆ.

Gen. ZEMEROS, *Boisduval.*

ZEMEROS FLEGYAS, *Cramer.* From Java.

Var. *Female.* With a broad transverse band of five conical spots beyond the middle of the wing. Malacca; Sarawak.

ZEMEROS EMESOIDES, *Felder, Wien. Ent. Monats.* Band iv. p. 396. Malacca; Sumatra; Sarawak.

Gen. SOSPITA, *Hewitson.*

SOSPITA STATIRA, *Hewitson, Ex. But.* iii. figs. 9–12. Mysol; Waigiou.

Var. *Female.* Above with the transverse band of the anterior wing broader; the outer margin of the posterior wing broadly rufous orange. Below with the posterior wing of a bright rufous orange. Salwatty.

SOSPITA SEGECIA, *Hewitson, Ex. But.* ii. pl. 46. figs. 4–6. Aru; Mysol.

SOSPITA WALLACEI, *Hewitson, Ex. But.* iii. figs. 7, 8. Mysol.

SOSPITA ECHERIUS, *Stoll,* pl. 31. figs. 1, 1*a*, 1*b*. Macassar.

Var. *Male.* Much larger and darker, the bands on the wings scarcely seen.

Female with the transverse bands of the anterior wing broader, whiter, and nearer together. Menado.

Var. S. (Abisara) Kausambi, *Felder, Wien. Ent. Monats.* Band iv. p. 397. Malacca; Sumatra; Singapore; Sarawak.

There is a great difference in size between large examples of *S. Echerius* and *S. Kausambi*, but there is no other distinction.

SOSPITA SAVITRI (Abisara Savitri), *Felder, Wien. Ent. Monats.* Band iv. p. 397.

Sospita Susa, *Hewitson, Ex. But.* vol. ii. pl. 46. fig. 2. Sumatra; Singapore.

Gen. TAXILA, *Doubleday.*

TAXILA DRUPADI.

Emesis Drupadi, *Horsfield, Cat. Lep. E. I. C. Museum,* pl. 2. figs. 3, 3*a*. Malacca; Sumatra; Singapore.

TAXILA ORPHNA, ♂, *Hewitson, Ex. But.* vol. ii. pl. 45. fig. 7.

Emesis Orphna, *Boisduval, Sp. Gen. Lep.* pl. 21. fig. 4.

Female. Above rufous-brown; anterior wing with the outer half carmine, crossed near the apex by a large orange spot. Below, as in the male. Sumatra; Singapore; Sarawak.

Var. *Female.* With a larger portion of the anterior wing carmine, the orange near the apex, the nervures and outer margin of the posterior wing carmine. Singapore.

TAXILA TELESIA, ♂, *Hewitson, Ex. But.* vol. ii. pl. 45. figs. 1, 2. Sumatra; Sarawak.

Female. Above, anterior wing carmine, marked by rays of dark brown: the base pale brown, crossed near the apex by a band of orange-yellow. Posterior wing rufous brown. Below, as in the male. Sumatra; Sarawak.

TAXILA TENETA, *Hewitson, Ex. But.* vol. ii. pl. 45. figs. 3, 4. Sarawak.

TAXILA PULCHRA, *Hewitson, Ex. But.* vol. iii., Taxila, ii. figs. 8–10.

Argynnis pulchra, *Guérin, Voy. Coquil.* pl. 16. figs. 2, 3. Waigiou.

TAXILA DECORATA, *Hewitson, Ex. But.* vol. iii., Taxila, ii. figs. 11–13. Aru; Dorey; Mysol.

Var. *Male.* Darker; the band of the anterior wing narrower, clouded. Dorey.

TAXILA THUISTO, *Hewitson, Ex. But.* vol. iii. pl. 45. figs. 5, 6. Sumatra; Singapore.

On the "Tsetse" Fly of Tropical Africa (*Glossina morsitans*, Westwood).

By JOHN KIRK, M.D., F.L.S.

[Read Dec. 15, 1864.]

HAVING travelled in regions infested by the fly whose bite is reputed so deadly to cattle, I venture to bring before you a brief *résumé* of what is known regarding it, adding such observations as my own experience has suggested. I do so the more readily as of late the statements brought forward regarding it have been called in question by men of science.

In 1850 Gordon Cumming drew attention to this subject*. He says that the natives tried to dissuade him from going further in the direction of the "Limpopo," telling him that he would lose all his cattle by a fly called the "Tsetse." In this region, I may remark, Captain Harris had, in 1837, marked on the map a "country abounding in flies destructive to cattle." Regardless of the double caution, Gordon Cumming advanced, and gives the following as his experience:—"The next day one of my steeds died of the 'Tsetse.' He had been bitten under the mountain-range lying to the south of the fountain. The head and body of the poor animal swelled up in a most distressing manner before he died; his eyes were so swollen that he could not see, and in darkness he neighed for his comrades who stood feeding before him."

Major Vardon next gave his experience. He had hunted about the same time and in the same region as Gordon Cumming. His statements regarding the fly are much more precise; and to him we are also indebted for the first specimens brought to Europe, which enabled Professor Westwood to describe the insect and determine its affinities†. Major Vardon further performed a most interesting experiment. Aware of the existence in certain districts of the Bechuana country of plants poisonous to cattle (such as the "Koñwhane," a species of *Lasiosiphon*), and suspecting that some such herb might be the cause of the mischief ascribed by the natives to the fly, he put the matter to the test by riding his horse into a "Tsetse"-infested part, without dismounting or allowing the animal to feed; the result was the death of the horse.

In a letter to Professor Westwood (*loc. cit.*) he says, "I fancy it is not met with south of the tropic of Capricorn; it is usually found on hills, plains being free from it. I have ridden up a hill and found the "Setse" increasing at every step, till at last forty or fifty would be on my horse at once. The specimens you saw cost me one of the best of my stud. He was stung by some ten or a dozen of them, and died in twenty days."

Mr. Oswell, one of the discoverers of Lake Ngami, and one of the first to reach the marshy regions of Central Africa on the Upper Zambezi, records what he observed regarding the "Tsetse" in a communication made to the Entomological Society*. Here we find noticed almost every point which has yet been brought forward. It is stated that the fly is strictly localized, and not known to shift its ground; that during the heat of the day it is active, but does not bite by night, and that the natives then pass cattle without loss through "fly country." Mr. Oswell believes that three or four flies are sufficient to kill a full-grown ox. Similar appearances were found by him in the bodies of twenty oxen which died after being bitten. These were a watery and wasted state of the flesh; stomach and intestines healthy; heart, liver, and lungs—sometimes all, invariably one—diseased, the substance of the heart in particular being soft; the blood diminished in quantity, albuminous and thick, not staining the hands when plunged into it.

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* Five Years of a Hunter's Life in the Far Interior of South Africa, ii. pp. 210, 227.

† Proceedings of the Zoological Society of London, Dec. 10, 1850, and Ann. Nat. Hist. 2nd ser. x. p. 138.

Mr. Oswell states that while man, the goat, and wild animals are bitten with impunity, as also calves sucking milk, other domestic animals perish; the symptoms being swelling of the eyelids, a watery discharge from the eyes, and considerable enlargement of the sublingual glands.

Dr. Livingstone, who accompanied Messrs. Oswell and Murray to Lake Ngami, and with the former experienced the fly on their way to the Makalolo country, makes frequent mention of the "Tsetse" in his 'Missionary Travels.' He amplifies and confirms what had been before stated, adding much to our knowledge of its habits and distribution. He mentions that the ass is not affected by the bite; and although the sucking calf lives, the dog fed on milk dies.

On one occasion Dr. Livingstone suffered a loss of forty-three of his oxen, and believes that not a score of flies were ever upon them. As an instance of the sharply-defined habitat of this fly, he gives that of the "Chobe," a stream fifty yards wide, on the north bank of which his cattle grazed in safety on pastures free from fly, while the south side was infested and had proved fatal, and this while the "Tsetse" was seen adhering to flesh carried across the stream in canoes.

Dr. Livingstone's most important observation is the connexion between the fly and large game, especially the buffalo and elephant, and its absence from parts where these do not exist, pointing to a possible means of ridding a country from this curse.

Other travellers in the south have encountered this fly, and all bring home the same tale.

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* Transactions of the Entomological Society of London.

Captain Burton met with "Tsetse" between Tanganyika and the coast*; and the native name given to it by him very closely resembles that in use on the Rovuma river, where we found it abundant. Specimens, however, from the Lake regions are not to be found in the British Museum.

In reference to this I have been kindly favoured with the following note from Captain Burton:—

"I certainly sent the 'Tsetse' to the British Museum, and saw it there in 1860. The only proof that the fly in question (by which I was often stung) kills cattle, especially cows, is the universal report of the natives of different and distant tribes. One of our cows died in Unyamwezi, and all who saw her declared it was the fly's poison. I have told all I know about it in the 'Lake Regions.'" (Signed) "R. F. BURTON."

During the Zambezi Expedition, the "Tsetse" fly has been met with by us on many occasions and at distant parts. It was first seen on the Zambezi at Lupata, a hilly and well wooded district 150 miles from the coast. To the north-east between the Zambezi and Shire it is very abundant. In some parts of the Batoka country, near the Victoria Falls, it was again found; also at the junction of the Chobe; and in immense numbers on the south bank, not far from the confluence of the Kafue.

On the Rovuma river in south latitude 10° it is met with eight miles from the coast, and extends along its banks for 115 miles, the furthest point explored; here we found it named "Chipanga;" "Kipanga" being that given to it at Kilwa, according to Capt. Burton. Wherever met with over this wide area of Tropical Africa south of the equator, the habits of this fly as recorded are the same.

It frequents open forest and well-wooded country, being absent from extensive grass plains. In the morning while the dew hangs on the grass, and before the heat of the rising sun has warmed the air, the "Tsetse" is dull and sluggish, resting on the under side of some leaf or blade of grass; when forced to take wing they may then be easily caught.

Even at nine o'clock they are not very active, and fly about with a peculiar buzzing sound; with the heat of the day they become a real annoyance to the traveller, constantly biting him on the hands, face, or neck, dextrously evading a blow, and again alighting on the very spot from which they have been driven. If permitted, they will gorge themselves with blood and become unable to fly to a distance. On man, the effects are not more than follow an ordinary mosquito bite, redness, swelling, and local irritation remaining for about an hour, varying in amount according to the state of the individual. In itself the bite is not so severe as that of the larger Tabanidæ.

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* Lake Regions of Central Africa.

By night I have never been bitten by "Tsetse," nor do they fly about after sunset. They are most numerous and troublesome in the hot sultry weather before rains.

When once the attention has been directed to the fly, it cannot again be overlooked, although, from its common and insignificant appearance, others might easily be confounded with it by those who have not before experienced it. There is therefore more danger of its geographical range being exaggerated than underestimated. Wherever I have found this fly, it has been accompanied by the buffalo or elephant; the native dog and goat are the only domestic mammals I have found in a country infested by it. Yet the English dog from the Cape is reported to have died like horses and cattle on entering the region, a difference perhaps due to breed.

The few instances I have known of oxen taken into "fly" country form no exceptions to the common experience, although, on their showing the first symptoms, they were slaughtered by us to save the flesh, which, when the animal is far gone, becomes uneatable even to savages who love butcher's meat and devour leopards, snakes, and unclean animals.

Although always found in company with large game, the fly does not follow it everywhere; other circumstances, still unknown, check its universal distribution.

Between Sesheke and Linyanti there is plenty of game, yet the fly is limited to certain narrow spots, and in like manner between Sesheke and the Victoria Falls. So are these falls shut out from the south by only a narrow belt of "fly" land, which may be crossed at night.

As much of what we know on these points rests on native information, I would remark that where the person obtaining it enjoys the confidence of the people and can speak with them in a common language, without depending on interpreters, native testimony on matters of fact is quite as good as European.

The Makalolo are a people from infancy accustomed to tend cattle, possessing a thorough knowledge of the most fattening pastures to be sought, and noxious herbs to be avoided. Their only wealth consists in cattle, which they number by thousands.

All affirm that on entering certain localities by day the oxen die shortly afterwards: this they have proved, not in the small numbers of twenty or forty noticed by Europeans, but in herds consisting of hundreds; whether in great or small numbers they have found the result alike. They have further learned that these deadly places may be crossed with safety by night if sufficiently narrow to allow of the cattle being driven through before sunrise. This has been tested by Europeans and found also correct; further, that goats remain unaffected; and sheep suffer in a less degree than oxen.

From observing a fly constantly present in these deadly parts, the natives have drawn the natural inference that it is the cause of the loss: nor indeed can I suggest a better theory; the fly is the only thing constant in all such parts, and absent from others with which we are acquainted. The fact that the sucking calf lives, while the mother dies, at once suggests the idea of some poisonous herb; Major Vardon's experiment, however, makes us doubt this; and the dog and cow both die, whose food is so unlike.

On the other hand, we find the confines of the fly and the disease exactly correspond; also when the fly is dormant no mischief ensues. The fly avoids human excrement, so the natives told us, and we have found it true, and they say that cattle have been passed by day through fly country when smeared with a composition containing this. Native doctors have an herb to which they attribute a similar effect, but even they never assert that it will save all; only a small per cent. of the cattle exposed is the most they claim.

It has been suggested that lung-sickness, African distemper, or some such disease is the cause of death. Is it likely that a number of intelligent men, all of whom had previously been acquainted with these diseases, should have failed to recognize them again? Besides, they differ manifestly from the "Tsetse" disease in being contagious and spreading from one place to another and from one animal to another, whereas only those bitten by the fly die; and no danger has been apprehended, or experienced, by such cattle mixing with others.

As to what that disease is I can say almost nothing. I have seen the animals become languid, lose flesh, droop the ears, swell at the eyes, which gave a discharge, the coat began to stave: as to the bites, they simply showed the smallest swelling, and a little moisture on the hair around. On dissection (the animals being killed when these first symptoms appeared) the flesh had in some degree lost its firmness, and the lungs at base were engorged. The first symptoms appear commonly within four days, but this varies with the number of flies and the season of the year. Natives report that cattle bitten die in greatest numbers before the rains, or when they set in, and that some animals will linger on until then; that having passed a fly country you do not know the full amount of loss until the rainy season has begun.

The number of flies sufficient to kill an ox has been variously estimated: Vardon speaks of ten or a dozen; Mr. Oswell of three or four; Livingstone thinks that not a score of flies were on his oxen. In the absence of direct experiment, this of course is guesswork; it only shows that a small number prove sufficient.

In most Tsetse countries, the traveller is not usually beset with more than two or three at a time; in the course of the heat of the day these might produce a number of bites, besides falling in with fresh flies as one advanced. But they are sometimes found in much greater numbers. On the south side of the Zambezi, near the confluence of the Kafue, while walking along the river bank in search of game, under shady flat-topped acacias, I heard a buzzing sound, and saw a cloud of insects coming towards me. Supposing them a swarm of bees, I ran off, while they followed. On looking back I found it was only "Tsetse;" so, arming myself with a leafy branch, I kept them off and continued my journey; they accompanied me for some distance however. I have never again seen them congregate in this manner; and, curiously enough, on this occasion, and on this only, did I obtain two of what may be the male insect; these bear the proportion to the females of 1 : 30, judging by the numbers then caught.

The systematic description of the "Tsetse" and its allies having been minutely entered into by Professor Westwood, I shall only add a brief description of the parts composing the mouth or biting apparatus. This consists of four pieces, of which two are lateral setose palpi, for the protection of the proboscis and its contained style. The lateral palpi are equal in length to the horny proboscis, which they embrace when at rest, but are thrown forward in a line with the body of the insect when in the act of sucking. They are of a deep brown colour, almost black at the tips, concave and finely hairy inside, outside convex and furnished with dark setæ, stronger and more numerous at the apex.

What in the common fly is a soft fleshy proboscis, becomes in the genus *Glossina* a straight, horny, chestnut-coloured bristle, smooth and polished, the apex slightly dilated and rounded, the base expanded into a large horny body of cordate form. The upper surface of this proboscis is grooved nearly to its distal extremity, and contains a slender glassy style, equal to the groove in length, which may be raised from its protecting sheath. This style is the biting instrument; it is convex above, deeply concave beneath, and cut off obliquely at the point; the margins are slightly waved, and near the base furnished with a series of minute pedunculate hairs. Where it joins the proboscis, near the base of the lobed dilated swelling, the edges approximate and form a tube.

In the description of *Glossina longipalpis*, Wied., given by Mocquart, it is suggested that within the grooved style there probably exists a tongue or second part. This Professor Westwood has figured, which in fact has no existence in the "Tsetse."

It has been suggested that the horny dilatation at the base of the proboscis may contain some very strong poison, or a gland for its secretion; on dissection I find in it nothing but a series of large muscular bundles arising from a common tendon attached to the grooved body of the proboscis, some of the muscular bundles embracing and attached at the other end to the membranous œsophagus or continuation of the grooved style.

When in the act of biting, the insect throws forward the two hairy palpi and raises the grooved style from the upper surface of the proboscis, which at the same time is turned backwards; then, by forcing the head down on the animal, the style is inserted,—no doubt in this assisted by the powerful muscular arrangement at its base.

The irritation which follows the bite in man shows that some irritant matter is at the same time injected (although no organ for its secretion has yet been detected), the object of which is no doubt to cause a local congestion, and thus facilitate the sucking of blood. The accidental effects of this, which in animals among whom the "Tsetse" naturally lives produces no after result, in the domestic animals before-named proves fatal.

On new Tubicolous Annelids, in the Collection of the British Museum. Part 2. By W. BAIRD, M.D., F.L.S.

[Read December 1, 1864.]

[PLATE V.]

Genus TEREBELLA, *Linn.* (*Montagu*).

1. TEREBELLA FLABELLUM, *Baird.* Pl. V. figs. 1 & 2.

The animal is as yet unknown, but the tubes are sufficiently remarkable to merit a description. The specimens, which have been deposited in the collection of the British Museum, vary in size, the largest being about 6 inches in length, and about the circumference of an ordinary goose-quill. They are cylindrical in form, tapering gradually from the summit to the base; the upper portion being the narrower. They are composed of a thin membranous substance internally, covered externally with numerous fragments of shells, corals, and pieces of horny zoophytes. The most characteristic feature, however, in the structure of this tube is the fan-shaped expansion of filaments at its upper orifice. This orifice is circular, and has on its dorsal surface a projecting lip or kind of hood (fig. 2), which extends beyond the mouth for a short distance, whilst from its ventral side springs another lip or hood (fig. 1), which quickly expands into a fan-shaped tuft of horny-looking filaments. This tuft is composed of several branches, each of which divides dichotomously into stiff but somewhat flexible filaments, spreading out horizontally to the length of an inch or more. These filaments are nodulous, and seem to possess a glutinous secretion, by means of which they are able to attach small shells, &c. to their surface.

Hab. These tubes, to the number of six, were collected during Sir J. Clarke Ross's Antarctic Expedition—two of them being registered in our collection as from *Narcon* Island. (Mus. Brit.)

2. TEREBELLA BILINEATA, *Baird.* Pl. V. figs. 3 & 4.

Animal with three pairs of branchiæ, composed of simple cirriform filaments (fig. 3). They are not arborescent, having no trunk or main branch from which the others spring, but are inserted in tufts of single filaments on the three first segments of the body, on each side. The tentacula are composed of numerous, rather long filaments, hollowed in the centre, and waved or undulated along the edge. In the specimens we have preserved in the collection, most of these have unfortunately fallen off. The bristle tufts are continued to the end of the body, and are about 36 in number. The segments of the body are rather deeply striated across, and the surface is somewhat granular in appearance. The body is thickest about the centre, and tapers suddenly from that to the inferior extremity. When alive, the animal is marked with two fine stripes or lines running longitudinally down along the dorsal surface beautifully tinged with purple.

The case or tube which this animal constructs (fig. 4), and which it inhabits, is of an irregular form, and consists of a thin transparent membrane, densely coated externally with numerous rough fragments of stones and shells, with some beautiful foraminifera mixed, coarsely cemented together and exhibiting a very rude appearance.

The total length of the animal is about 3 inches, and that of the longest tube is about 4 or 4½ inches.

Hab. Falkland Islands. Collected by Mr. W. Wright. (Mus. Brit.)

Genus Sabella, *Linn.* (*Savigny*).

1. Sabella bipunctata, *Baird.*

Worm rather slender, somewhat flattened, slightly tapered towards the posterior extremity.

Branchial fans large, about one-third the length of the body; of a dark purple colour towards the base, where the filaments are all united by a web for a short distance. Each filament is marked on the smooth rachis at regular distances with two small round purple spots. There are five pairs of these spots on each filament, the first being near the base and the last a short distance from the apex. The filaments are all rather densely and closely ciliated on one side. The two tentacula are smooth and setaceous, short, stout, and sharp pointed at the apex. The collar is slightly lobed; and the upper part of the body, on the ventral surface, a little below the head, is stained with a rather broad dark purple mark, and along each side of the body, at the base of each foot, is a small spot of the same colour. The thorax has ten pairs of setigerous feet, and the purple spots at their bases are much larger than those at the base of the feet belonging to the abdominal segments. In one specimen (which I cannot see differs specifically from the others in other respects) the setigerous feet are twelve pairs in number and the body is somewhat broader.

The tube which the animal constructs, and in which it lives, is narrow, about the circumference of a swan-quill, long, round, and consists of a toughish membrane covered with a rather thick, smooth coat of mud.

The length of the animal is about 3 inches; that of the tube about 4½ inches.

Hab. Island of St. Thomas, West Indies. Collected by M. Sallé. (Mus. Brit.)

2. Sabella nigro-maculata, *Baird.* Pl. V. figs. 5 & 6.

Worm rather short, broad and stout, tapering slightly near the posterior extremity (fig. 5).

The branchial fan consists of numerous short filaments united near the base by a web, and about the fourth part of the length of the body. They are of a dark brown colour spotted with white on the rachis, are densely ciliated on one side with long stout cilia, and on the rachis, which is smooth, there are at regular distances about twenty other very short filaments, set in pairs (fig. 6). Near the base of the filament spring a pair longer and broader, and near the middle of its length another pair of the same kind. The collar is deeply lobed and of a dark purple colour. The body throughout its whole length is spotted with numerous dark purple or nearly black dots of various sizes, but largest on the superior extremity. The thorax possesses seven pairs of setigerous feet. The two smooth filaments are short and flat, and sharp pointed at the apex. The tube in which the animal lives is rounded, and is composed of a toughish membrane covered outwardly with a smooth coat of mud.

The length of the animal is about 2½ inches; that of the tube nearly double the length.

Hab. Island of St. Vincent, West Indies. From the Rev. Lansdowne Guilding's Collection. (Mus. Brit.)

3. Sabella occidentalis, *Baird.* Pl. V. figs. 7 & 8.

Worm slender, of a cylindrical form, slightly tapering towards the posterior extremity (fig. 7).

Branchial fan composed of about sixteen filaments on each side. The filaments are densely ciliated on one side; the cilia of a yellow colour for most part, interspersed at short distances with black cilia, generally disposed in pairs, or in clusters of three, and rather stouter than the others. The rachis is smooth, but dotted along one side with numerous very small black spots (fig. 8). The filaments are all united near their base by a web, which is of a dark purple colour. The two smooth filaments are short, and sharp pointed at the apex. The collar is narrow and slightly bilobed. The thorax has seven pairs of setigerous feet. We possess no tubes belonging to the specimens.

Hab. Island of St. Vincent, West Indies. From the Collection of the Rev. Lansdowne Guilding. (Mus. Brit.)

4. SABELLA GROSSA, *Baird.*

Worm remarkably thick, short and solid-looking, of a uniform dark olive colour, and about the same dimensions anteriorly as posteriorly.

The branchial filaments of the only specimen we possess have unfortunately been destroyed, but the peduncle upon which they were placed remains, and exhibits a spiral twist like that represented in M. Milne-Edwards's figure of *Sabella unispira* in Cuvier's 'Animal Kingdom' (Crochard edition, t. 4. fig. 1*a*). The collar is everted, thick, and bilobed. The thorax possesses eight pairs of setigerous feet. The smooth (?) tentacles are wanting; the specimen, which has been for a good many years in the Museum Collection, being in only tolerable preservation. There is no tube belonging to the specimen. Length of animal (without branchiæ) about 4 inches, breadth about 7 or 8 lines. In general appearance it resembles *S. melania* of Schmarda from Jamaica.

Hab. Island of St. Helena. From the Collection made during the voyage of H.M.S. 'Chanticleer.' (Mus. Brit.)

5. SABELLA GRANDIS, *Baird.*

Worm of a rather square or quadrilateral shape, tapering slightly to the extremity, which terminates in a sharp point. Length (without branchiæ, which unfortunately have been lost) about 6½ inches.

Collar rather broad and deeply bilobed. Thoracic feet seven pairs. Segments belonging to them smooth, not grooved on the upper dorsal surface. Body of a dark brown colour on the back, rather yellow underneath or on the ventral surface. Feet numerous, about 100 in number. Peduncles large, well developed. Anterior and posterior divisions separated by a groove, in the centre of which are situated the feet. Along the dorsal surface, with the exception of the seven first or thoracic segments, there runs a deep groove dividing each segment into two halves. The setæ of the feet appear in many instances to be enveloped in a membranous little bag, which, falling off, allows the setæ to project. These are short, slender, smooth, setaceous, and very sharp pointed.

The case in which the worm lives is somewhat larger than the animal itself, and is a round and leathery-looking tube covered over externally with a thin coat of mud.

Hab. Coast of New Zealand. From the Collection of Sir A. Smith, M.D. (Mus. Brit.)

Description of a New Variety of *Lepidonotus cirratus* parasitic in the Tube of *Chætopterus insignis*. By W. Baird, M.D., F.L.S.

[Read December 15, 1864.]

In the last volume of the 'Linnean Transactions' I described a new species of *Chætopterus* as British, and, at p. 485, Mr. Williams of Beaumaris, in his notes upon this Annelide, mentioned that generally speaking a species of *Lepidonotus* (*Polynoë*) was found by him living parasitic in the tubes of that animal. In a short note I mentioned that the parasitic worm was a variety of *L. cirratus*. I now beg to lay before the Society a fuller description of it.

LEPIDONOTUS CIRRATUS. Var. *parasiticus*, Baird.

Body about 1½ inch long, and at the widest part, including the setæ of the feet, 6 lines in breadth. It is slightly narrower near the anterior extremity. The scales are fifteen pairs. They cover the whole body, increase in size as they descend from the head, near which they are small, nearly circular in form; afterwards they become reniform and are covered with innumerable very small rough points, which are scarcely visible without the assistance of a glass of low power. The external edge is ciliated, or fringed with short clavate hairs. The head is concealed by the upper pair of scales. Eyes four in number; the upper pair wider apart than the lower. Of the three antennæ, the central or odd one is setaceous, suddenly terminating in a long, slender, sharp point, and beset with rather numerous short clavate hairs. The lateral pair are shorter than the central one, setaceous, smooth, the lower half conical in form, stout, marked across with a double purple streak, and, like the other, terminating suddenly in a long slender white point. Palpi very stout, especially near the base, setaceous, terminating more gradually in a point, and quite smooth. Tentacular cirri setaceous, and like the central antenna terminating suddenly in a long slender point, and beset with short clavate hairs, but with no enlargement or swelling near the apex. These organs are all short, and nearly of equal length, though the palpi are somewhat the longest and much the strongest. The cirri of the second pair of feet are smooth and setaceous; all the others are longer, setaceous, ringed with black below the apex, but without any swelling or enlargement there, terminating in a slender sharp point and beset with short clavate hairs. The caudal cirri are short. The feet are thirty-seven pairs in number. The dorsal branch gives off a tuft of dark-coloured spines, generally covered with sordes, but when placed under the microscope are slender, with a smooth stalk, but finely denticulate for some way down from the apex, on both edges. The ventral branch is conical, rather sharp pointed, and gives off a tuft of yellow bristles. These are longer and stronger than those of the dorsal branch, and are strongly denticulate for some distance from the point. This variety differs from the typical form of *cirratus* in being altogether broader in shape; in being narrower at the anterior extremity than the posterior, the reverse of which is the case in *cirratus*; and in the cirri not being swollen or enlarged a little below the apex.

It is found inhabiting the tube or case of living *Chætopteri*. Mr. J. Williams, of Beaumaris, to whom I am indebted for the specimens, finds them nearly constantly in the case of the *Chætopterus insignis* at low water. In his letter to me he says, "it is generally found crouching on the lower segments of the body of the *Chætopterus*, and the earliest indication of the death of that annelide is the exit of the parasite from the tube."

Hab. Menai Straits, near Beaumaris. J. Williams. (Mus. Brit.)

On *Dicellura*, a new genus of Insects belonging to the Stirps *Thysanura*, in the order *Neuroptera*. By A. H. HALIDAY, A.M., F.L.S.

[Read January 21, 1865.]

THE genus is founded on an undescribed insect allied to *Campodea ambulans*, L. (sp. *Podura*) in general appearance and habits, but distinguished especially by having (in place of the pair of many-jointed filaments which terminate the abdomen in that species) a forceps like that which characterizes the Stirps *Labidura* in the same order. *Dicellura solifuga* appears to have a pretty extensive range in latitude, having been found, firstly, by Mr. Lucas in Algeria; afterwards at Paris, by the same author, who has received it also from the neighbourhood of Toulon; while the writer has found it in different parts of Central and Southern Italy. The institution of a family Dicelluridæ is suggested to comprize the two genera named, and distinguished from the remaining circumscribed group of *Lepismidæ* by the binary number of posterior appendages, the exarticulate tarsus, the simply falcated maxillæ, without exterior lobe ("galea") or palpus; and, as to internal organization, above all, by the want of Malpighian vessels.

Nicoletia terrestris, L. (sp. *Lepisma*) may be a connecting link, resembling *Campodea* in the form of body, equally scaleless and bleached, and having the internal lobe of the maxilla pectinated somewhat alike; but, in this view, the internal anatomy of *Nicoletia* remains to be investigated. From Poduridæ the proposed family differs no less by the oral organs, than by the essentially many-jointed antennæ, the full normal number of abdominal segments developed, the consequent direction of the terminal appendages, and the elongated tarsus, armed with a pair of equal unguiculi.

On Animal Individuality from an Entozoological point of view.

By T. Spencer Cobbold, M.D., F.R.S., F.L.S.

[Read June 1, 1865.]

When Dr. Carpenter in the first instance, and Professor Huxley subsequently, promulgated their original and philosophic views respecting the question of animal individuality, they virtually established a general proposition regarding the constitution of the "zoological individual," which forms an admirable stand-point by whose aid we may interpret the significance and relations of a series of life-phenomena which must otherwise have long remained misunderstood and, consequently, also undervalued.

The general proposition here referred to was formally embodied in the announcement that the "zoological individual" comprises the sum-total of the phenomena displayed by all the products of a single ovum, or, to employ Prof. Huxley's own words, "the *individual* animal is the sum of the phenomena presented by a single life."

Physiologists have long since maintained that the human frame, during its life-period, is represented by several epochs, each of which is absolutely distinctive and separable in so far as actual matter or tissue is concerned, but inseparable and almost indistinctive as regards mere appearances, whether external or internal. In other words, during man's growth we have a definite succession of life-phases which are analogous to, if not in any sense homologically identical with, the distinctive and peculiar temporary forms of life so notably characteristic of certain of the lower animal types.

Taking, as it were, a bird's-eye view of the whole zoological series, these temporary life-phases display every degree of distinctiveness from the almost imperceptible up to the separable, free, individual-like being for the designation of which Prof. Huxley has felicitously proposed the term "zoöid." All these phases are now known to be phenomena of growth, metamorphosis, and gemmation, there being no such thing as "alternate generation" in the truest sense of this phrase*.

Applying these principles to the interpretation of the phenomena of entozootic life, some very curious results appear to be attainable when we come to deal with the more complicated forms. Starting, however, with a species where the individual is represented by simple, non-metamorphosed life-phases, we necessarily encounter the almost indistinctive conditions of ordinary growth. Thus I select, in the first instance, the so-called *Trichina spiralis*, whose life-phenomena (according to the synoptical method initiated in my work on Entozoa) may be tabulated as follows:—

ZOOLOGICAL INDIVIDUAL (*Trichina spiralis*).
- *a.* Ovum in all stages.
- *b.* Intra-uterine embryo.
- *c.* Free embryo or migrating larva.
- *d.* Resting or sexually immature larva.
- *e.* Expectant or sexually distinctive *Trichina* (often encysted).
- *f.* Free, sexually mature intestinal *Trichina*.

Now, although the various larval stages above indicated bear a general resemblance to the adult *Trichina*, we have, even here, some faint traces of "epochs" which, were they only rather more strongly pronounced, would enable us to draw lines of demarcation. In some instances the life-epoch may be homologically identical with a temporary bud, but it may also comprise a multitude of *gemmæ*. Each such successive life-epoch, whether distinctive or indistinctive, separable or inseparable, I propose to call a *biotome*; and when two or more such life-divisions are recognizable, I propose to call them "secondary" or "tertiary" biotomes, as the case may be. I would observe that the term "biotome" is not designed to supersede the term "zoöid," but rather to limit the latter to an individualized, free, constituent portion of the "biotome." The propriety of this arrangement will, I think, appear in the sequel. Let us, therefore, in the next place, glance at the life-phases of one of the cestodes. Those of *Tænia serrata* may be tabulated thus:—

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* Since this passage was written, I have received an important communication from Professor Leuckart, in which he states that he has reared sexually mature free Nematoids, of the genus *Rhabditis*, from *Ascaris nigrovenosa*. If this be the case, we have here, for the first time, a true alternation of generation, or, to say the least, a true sexual dimorphism in animals (Nachrichten von der Königl. Gesellschaft der Wissensch. zu Göttingen, No. 8, April 19, 1865, p. 227).

ZOOLOGICAL INDIVIDUAL (*Tænia serrata*).

a. Ovum in all stages	Primary "biotome."
b. Six-hooked embryo, boring larva, or proscolex	
c. Resting larva, scolex, or *Cysticercus pisiformis*	
d. Sexually immature tapeworm in all stages	Secondary "biotome."
e. Mature tapeworm-colony, strobile, or *Tænia*	
f. Segment, free-joint, or *proglottis* (zooid)	

According to Prof. Huxley's views, in the above "individual" the stages *a*, *b*, *c*, *d* would collectively represent the first life-phase or "protozooid," whilst the final phase, *f*, would be the "deuterozooid." I have, indeed, with Professor Huxley's approval, so represented them in my introductory treatise on Entozoa; but, recently, I have not been able to satisfy myself that the nomenclature in question meets all the requirements of the case. In my view, the six-hooked embryo is as much an individualized form as the *Cysticercus*-stage, whilst the latter is as much a life-phase as the *proglottis* itself. Why therefore may we not here recognize three zooids (proto- deutero- trito-zooids), instead of two only, after the manner suggested by Prof. Huxley? If this view be accepted, our *Tænia serrata*, in its full zoological individuality, would be represented by two biotomes, the primary one comprising two individualized phases (the proscolex and scolex, or protozooid and deuterozooid), and the secondary one comprising a practically indefinite number of individualized forms or tritozooids. In the one case the independent life-phases are the result of metamorphosis, but in the other they are the product of gemmation. Let us next see how the matter stands in regard to one of the Trematodes, say, for example, the common liver-fluke (*Fasciola hepatica*), which may be tabulated as follows:—

ZOOLOGICAL INDIVIDUAL (*Fasciola hepatica*).

a. Ovum in all stages	First "biotome."
b. Ciliated free-swimming embryo	
c. Non-ciliated larva (nurse, germ-sac, sporocyst, *redia*)	Second "biotome."
d. Active, migrating, tailed larva (*cercaria*)	Third "biotome.'
e. Encysted, resting larva (*pupa*)	
f. Sexually mature fluke (*fasciola*)	

This is probably a fair representation of the ordinary fluke individual (*Fasciola hepatica*), in which species the entire life-phases have not as yet been thoroughly identified. It is quite certain that the life-phases are never less numerous or complicated than is here indicated; whilst Pagenstecher's researches tend to prove that, under certain climatal conditions, the number of larval forms may vary considerably. In other words, the fluke individual does not comprise any definite number of "zooids," although the kinds of zooids are limited. In the present case I recognize three "biotomes." The first includes only one temporary, independent life-phase; this is the ciliated animalcule, which, in my view, possesses sufficient individualized life to entitle it to be recognized as a "protozooid." The second "biotome" may in some cases comprise only a solitary, simple sporocyst or germ-sac (deuterozooid); but an almost indefinite multiplication of new and independent germ-sacs, as well as other more highly organized "nurse-formations," may also be developed from the primary sporocyst (secondary and tertiary "deuterozooids"). This reminds us of the practically indefinite number of zooids (proglottides) which the second "biotome" of the Cestode gives rise to; but here there is analogy, and not homology. The third "biotome" embraces a large but variable number of "tritozooids" (*cercariæ*), an equal number (whatever that may be) of "tetartozooids" (*pupæ*), and therefore, also, a similar number of "pemptozooids" (flukes).

Whether the views here promulgated be accepted or not, I have, I trust, made it sufficiently clear that the fluke-individual may comprise, in its life-cycle, a great and varying number of life-phases, each of which may or may not possess equivalent (and, necessarily, very limited) zoological value. The variability of the character of these life-phases is shown by the sporocysts (deuterozooids), which are not only unequal to one another in bulk, but also in organization, the higher forms (rediæ) developing a rudimentary digestive apparatus. Apparently the *redia* is not, in all cases, an essential feature of Trematode larval life. Putting together the whole possible and independent life-phases, and placing their numerical development within the lowest limits, our ordinary fluke-individual would, I reckon, comprise about 370 "zooid" formations, those of the second "biotome" being produced by the well-known process of internal gemmation, whilst those of the third "biotome" are the result of a simple yet prolonged metamorphosis.

I conceive that Dr. Pagenstecher's apparently well-established proposition (that "only such Trematode larvæ as are capable of arriving at sexual maturity are furnished with special appendages") gives strength to my views regarding the recognizable epochs in the fluke-individual's life, and points to the line of origin, continuity, and definiteness of the third "biotome" which I have recognized on totally independent grounds. There is about the same relative amount of individualized being in the caterpillar, pupa, and imago states of the Insect as there is in the cercaria, pupa, and fluke conditions of the Trematode; but the "epoch" of the one embraces the whole life of the "zoological individual," whilst in the other it represents only a section or "biotome" of the life-cycle. If the term "zooid" be not allowable for the separate metamorphosed life-phases, as well as for true gemmæ, some other distinctive nomenclature must be substituted. I would like to see it retained to designate the semi-individualized, separable life-phase, without regard to its mode of genesis.

Practically, other curious results arise out of the foregoing considerations. For example, a single sheep may harbour 1000 flukes. Each fluke carries, I believe, at least 10,000 eggs. Each egg may give rise to 370 zooids. It thus appears that, if all the conditions were favourable, a single fluke might originate between three and four millions of individualized life-forms; whilst the solitary sheep itself would, under the same circumstances, be the means of producing at least 3,000,000,000 fluke-zooids! Happily no such result as this can possibly occur in nature, since a multitude of "interfering agencies" places the "favourable conditions" in a comparatively insignificant minority. However, the balance of parasitic forms from all cattle-sources is sufficient to destroy thousands of sheep annually, to say nothing of the wounds inflicted on millions of small mollusks, into whose bodies the "zooids" penetrate.

Reverting to the Cestodes, the results attainable from particular species are, in some respects, still more striking. Let us separately examine the "zoological individuals" of *Tænia cœnurus* and *Tænia echinococcus*. The life-phases of the former may be tabulated as follows:—

ZOOLOGICAL INDIVIDUAL (*Tænia cœnurus*).

a. Ovum in all stages	First "biotome."
b. Six-hooked embryo, boring larva, or *proscolex* ...	
c. Resting, polycephalous larva (*Cœnurus cerebralis*)	

d. Sexually immature tapeworm	Second "biotome."
e. Mature tapeworm-colony, or strobile	
f. Segment, free-joint, or *proglottis*	

At first sight, this representation appears to be the same as that of the *Tænia serrata*, already given. It is, in truth, zoologically equivalent, but the component life-phases are both structurally and numerically different. The "resting larva" of *Tænia serrata* consists of a single free scolex, whilst the resting larva of *T. cœnurus* comprises a multitude of conjoined, inseparable *scolices*. In the one case the scolex is a true "zooid," in the other it is the merest fraction of a "zooid." In the case of *Tænia serrata* one single egg, under the most favourable conditions, can only lead to the development of one tapeworm; but, under like circumstances, the single egg of *Tænia cœnurus* may lead to the formation of at least 300 tapeworms. This is accomplished when the *Cœnurus* of the sheep's brain is transferred to the stomach of the dog, and all the scolex-heads with which it is furnished become developed into tapeworms. If we call to our aid an estimate of the "zooids," the result is much more markedly significant. On the plan of interpretation previously adopted, the "zoological individual" of *Tænia serrata* (allowing 500 proglottides for the strobile) would only yield us 503 "zooids" (as I have defined them); but in the case of *Tænia cœnurus* this representation would certainly give us as many as 1,500,000 "zooids." Then, as regards the total number of eggs produced by all the final "zooids" collectively, we should, in the case of *Tænia serrata* (allowing each proglottis to contain 5000 ova), obtain the comparatively small total of 2,500,000 eggs; whilst in the case of *Tænia cœnurus*, the progeny of a single germ would collectively give out no less than 7,500,000,000 ova! Lastly, let us glance at the possible results derivable from a consideration of the "zoological individual" of *Tænia echinococcus*, which may be tabulated after the same fashion:—

ZOOLOGICAL INDIVIDUAL (*Tænia echinococcus*).

a. Ovum in all stages	First "biotome."
b. Six-hooked embryo, boring larva, or proscolex	
c. Resting, acephalocystic larva (hydatid)	
d. Sexually immature tapeworm	Second "biotome."
e. Mature tapeworm-colony, or strobile	
f. Segment, *proglottis*, or free-joint	

Here, again, the representation is as simple as obtained either in the case of *Tænia serrata* or in *Tænia cœnurus*; but, in point of numerical and structural detail, the life-phases are remarkably different. In this case the "resting larva," as in *Cœnurus*, is furnished with a multitude of "heads," the latter being the so-called echinococci or scolices developed in a rather more complete form than obtains in the case of *Cœnurus cerebralis*. In fact, the so-called "heads" are almost separable "phases," being attached to the maternal larva by slender pedicles only. They are, indeed, frequently found detached; but then it is questionable if they have not already parted with their vitality. In this view I cannot call them "zooids"; but the daughter-hydatid formations, which are developed within or without the original maternal hydatid, are quite deserving of such distinction. The latter are separable, organized life-phases, each of which, like its parent, may develop a multitude of echinococci; so that, under favourable conditions, there is practically no limit to the number of "heads" which may be generated by a proliferating hydatid; consequently, also, there is practically no limit to the number of tapeworms liable to be developed from the same source. The tapeworms in this case, however, have only three joints capable of arriving at sexual maturity, and only one of these is mature at one and the same time. Whether or no these *Tæniæ* are susceptible of indefinite proglottis-multiplication, after the fashion of ordinary tapeworms, is a point on which I am, at present, uninformed; it is probable, however, that the joints follow the ordinary law of successional development. In either case our computation of the number of zooids and eggs capable of arising from a single germ needs not be affected by this consideration. Taking an average case of hydatid development, and assuming the existence of conditions favourable to the complete development of the entire progeny, a single germ of *Tænia echinococcus* might, without any exaggeration, give us between five and six million separate life-phases or "zooids," from which, under like circumstances, there would result not less than 150,000,000,000 ova! In this calculation I do not take into account the probability of any one tapeworm developing more than three successive sexually mature segments, and I allow for each proglottis (tetartozooid) 10,000 eggs. For each hydatid I allow 10,000 scolices, though one large acephalocyst may develop ten times that number. As many as a thousand hydatids, or more, may be developed in a single "host"; but echinococcus-heads are not usually present in more than a limited number of the daughter vesicles. Were they less "cribbed, cabined, and confined" than is usually the case, no doubt their power of developing the so-called "heads" would be correspondingly increased. As it is, we may truly say, "*Quantitas sufficit.*"

Remarks on the best Methods of displaying *Entozoa* in Museums.

By T. Spencer Cobbold, M.D., F.R.S., F.L.S.

[Read June 1, 1865.]

The Council of the Royal College of Surgeons having afforded me an opportunity of remodelling their collection of internal parasites, I have, while thus engaged, introduced a few novelties in the mode of mounting the specimens, and I have ventered to think that a brief notice of them might be usefully placed on record.

Some years' experience with the practical working of museums has satisfied me that for the secure and permanent closure of spirit preparations no plan surpasses the old Hunterian method; but in cases where it is desired to remove the specimens for temporary examination or redissection, the employment of any particular kind of jar becomes a mere matter of taste. The wide glass-stoppered jars are unsightly, inconvenient, and expensive; nevertheless they are preferable to the common medicine-phials now employed in the British Museum. Retaining the Hunterian plan in so far as mere closure is concerned, I would invite attention to the following points:—

1. Except in cases where the specimens are large and bulky, it is always advisable to attach the objects to sheets of mica. The employment of mica is in itself no novelty, but it has been usual to suspend the mineral in the jar with the specimen attached. This is not necessary. It should always be fixed to the sides of the jar, which may easily be done by making the mineral plate a little wider transversely than the corresponding diameter of the jar. The elasticity of the mica, if not too thin, will ensure fixity. I introduced this method ten years ago, and on this principle mounted a series of *Entozoa* in the Anatomical Museum of the Edinburgh University. The form of the jar may vary, but it is essential that the aperture be nearly of the same diameter as the body of the vessel; otherwise, on introducing the specimen, the mica sheet will be injured by too great a strain upon its elasticity. For my own part, I prefer that form of jar first recommended by Prof. Goodsir. In this case (as shown by the preparations on the table) the rim and aperture resemble those of an ordinary hyacinth-glass. This leaves a circular shelf on which Mr. Goodsir used to place a bridge of stout whalebone, and by means of suspensory threads the mica and specimens were attached in the ordinary manner. I have long ceased to adopt this plan. As regards affixing, in the case of complete specimens, it is highly desirable

that their position should be made to correspond with the attitudes which they assume in nature.

2. In the case of Hydatids, and in instances where it is desired to show a large mass of parasites, I have occasionally reversed the above method. Thus, in place of a vertically disposed sheet of mica, I introduce a circular diaphragm of the same substance, its diameter slightly exceeding the width of the jar. The mica should be stout; otherwise the weight of the spirit (on the jar being moved or carelessly inverted) will be sure to displace the diaphragm. It should be carried about two-thirds of the way down the bottle, and be fixed in an obliquely transverse position. The specimens are thus suitably displayed at or near the centre of the vessel. It is unnecessary to fix them to the mica; but, if desired, they may be retained in their place by a second or superimposed diaphragm. Ordinarily this is not advisable.

3. Where the parasites are very minute, yet still sufficiently visible to the naked eye to be worthy of museum display, a thin, square, oblong or circular plate of mica may be applied and fixed to the vertical sheet, including the objects after the fashion of ordinary microscopic preparations. This seemingly simple method, however, required great care and patience; for, in place of using cement, it is necessary to fix the two mica plates together by means of fine thread. In doing this the operator is liable to displace or distort the specimens; but when once accomplished without disturbance, there is no fear of subsequent injury. This method is eminently suitable for the display of Oxyurides, Sphærulariæ, and other minute Nematodes, which in our pathological collections are usually seen lying at the bottom of the vessels enclosing them. In some instances, as obtains in the British Museum, I have seen the specimens enclosed in a second vessel or glass tube, the one swinging within the other in a very slovenly manner*.

4. In certain cases where none of the above-described methods are altogether satisfactory, I have introduced another plan which I am particularly desirous of bringing under the Society's notice.

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* The Entozoa within our national collection are both numerous and valuable. At present, however, the bottles containing them are lodged within a glass case, the latter being itself placed in a dark passage leading to the so-called "insect-room." The specimens have been skilfully catalogued; but, for want of space, they are huddled together without any definite or systematic arrangement. For the furtherance of the interests of science they are practically unavailable. It is earnestly hoped that Dr. Baird's efforts to secure a proper apartment for their exhibition may yet meet with success.—T. S. C.

It refers to the employment of various-sized watch-glasses. They are affixed to the vertical sheets of mica, and the specimens are introduced into their concavities; each glass being fastened to the mica by threads passed through two or more holes previously drilled at its circumferential margin. I find two holes sufficient, one on either side; but greater fixity and security may be obtained by boring more apertures at equidistant intervals. This adds, however, to the expense and risk of breakage. The holes should freely admit the passage of an ordinary needle. This plan is eminently suitable for the display of small flukes, Cysticerci (of the "measle" kind), and minute Hydatids.

5. A few years ago I initiated the employment of carmine, aniline, and other pigments in the preparation of Entozoa for museum purposes, and I am glad to be able to state that the specimens thus first treated still retain their colouring almost unimpaired; at least, this is the case with those saturated with carmine. For microscopic purposes, these pigments had long previously being employed both here and on the Continent. Some of the magenta-dyed preparations have stood very well, where the carbolic-acid solution had been sufficiently strong to fix the colour. The specimens preserved in the Museum of the Middlesex Hospital, however, hardly offer a fair criterion of the durability of this latter pigment, since the preparations have been all along exposed to a strong sun-light. In a large collection the use of carmine should not be excessive, but in particular instances (as, for example, in the encapsuled condition of *Trichina spiralis*) its employment cannot be too highly recommended.

[The above remarks were illustrated by the exhibition of specimens of Hydatids, Cysticerci, Amphistomata, Sphærulariæ, Trichinæ, Spiropteræ, and Cœnuri, prepared by the author for the Museum of the Royal College of Surgeons.]

Contributions towards a Monograph of the Species of *Annelides* belonging to the *Aphroditacea*, containing a List of the known Species, and a Description of some new Species contained in the National Collection of the British Museum. By W. Baird, M.D.

[Read June 1, 1865.]

"Animalium molluscorum in mari degentium vix centesimam partem bene novimus. Tanta autem est Naturæ in eorum forma et fabrica varietas, et tanta non modo inter genus et genus, sed inter generum extremas quoque species plerumque discrepantia, ut vel exercitatissimi in his sæpe dubii hæreant quonam hoc vel illud noviter repertum ex hac classe animal referant, quove nomine adpellent."—*Pallas. Miscell. Zool.* p. 72.

Amongst the *Aphroditacea* are several *Annelides* which are remarkable for their size and beauty. The genus *Aphrodita*, from which the family derives its name, was created by Linnæus to contain the brilliantly shining and splendidly iridescent-haired worm, commonly known by the name of the Sea-Mouse, and several other allied species which now form the types of distinct genera. Of these MM. Audouin and Milne-Edwards enumerate 6, and Grube 7; but later authors have so increased the number of species belonging to these, that Kinberg, a Swedish naturalist, and one of the most recent writers on the subject of the *Annelides*, has found it convenient to form almost each of the older genera into distinct families. In this paper I propose adopting his arrangement, as well as his terminology.

MM. Audouin and Milne-Edwards, and most succeeding authors, describe the animals belonging to the *Aphroditacea* as possessing *five* antennæ—one, single, in the centre, which they call the median antenna, or *antenne impaire*, two others (one on each side) which they denominate the intermediate, and two others, which they call the external. In addition to these organs connected with the head, are a pair of antenna-like organs which terminate the first pair of feet, instead of a fascicle of bristles, and which they describe by the name of the ventral cirri of the first pair of feet. Kinberg looks upon the single antenna in the centre as being a *tentacle* or feeler; the intermediate antennæ he considers the *true antennæ*; and the external ones he calls *palpi*; whilst the ventral cirri of the first pair of feet are denominated the *buccal cirri*.

Family I. APHRODITIDÆ.

(Aphroditacea, *Kinberg*.)

The family *Aphroditidæ* may be thus characterized:—Animals of an ovate or oblong form, convex on the back, with a distinct head in the form of a lobe, on the sides of which are situate one pair of eyes, and from the centre of which springs a small tentacle; underneath it there is a granular facial tubercle; no antennæ; two palpi, springing from the base of the head-lobe; buccal cirri short, tentacular cirri long; jaws cartilaginous, not very distinct; branchiæ indistinct; elytra 15 pairs, occurring on the 2nd, 4th, 5th, 7th, and all alternate segments of the body to the 25th, on the 28th, and 32nd.

The family thus characterized will now be restricted to four genera, all of which have strict relations with each other.

The genus *Aphrodita*, as now restricted, will contain those species in which the eyes are sessile, which have the back covered with a thick coat of felty hair, and in which the bristles issuing from the feet are all simple.

The genus *Hermione* will contain those species in which the eyes are peduncled, which have no, or only a very thin, covering of felty hair on the back, and in which the bristles of the feet are of two kinds—those on the dorsal branch being barbed like an arrow, and those on the ventral branch bidentate.

The genus *Aphrogenia* contains such species as have the eyes sessile, which have no felty covering on the back, and in which the bristles of the dorsal branch of the feet are uncinate, not barbed, and those of the ventral branch bidentate.

The genus *Lætatonice* will contain those species which have the eyes peduncled; which have a felty covering on the back; and in which the bristles of the dorsal branch of the feet are densely barbed, and those of the ventral branch semipennate.

The known species belonging to the family are not numerous, only nine or ten having as yet been described; but, in determining the species contained in the national collection in the British Museum, some new forms have occurred to me which I think it is desirable should be described and placed on record.

Genus I. APHRODITA*, *Linnæus*.

Halithea (part) (Halitheæ simplices), *Savigny*.

Eyes sessile; back covered with a thick, close felt of matted simple hair and membrane; setæ of ventral feet very numerous and iridescent, and, as well as all the other bristles, simple, not barbed or toothed.

Sp. 1. APHRODITA ACULEATA, *Linnæus*.

This is the well-known Sea-Mouse, occurring in most of the seas of Europe. It is mentioned under various names by many of our earlier British writers, Mouffet, Sibbald, Molyneux, Dale, &c., as common on our own shores. Linnæus, who first gave it its scientific name, called it, in the 1st edition of the 'Fauna Suecica,' 1746, *Aphrodita nitens*; but in the 10th edition of the 'Systema Naturæ,' 1758, he changed the specific name and called it *Aphrodita aculeata*, a name which he repeated in the 2nd edition of the 'Fauna Suecica,' 1761, and which has been adopted by all succeeding authors up to the present time. According to the strict law of priority, we ought perhaps to revert to the first-published name of the species, and name it for the future *Aphrodita nitens*; but in this instance I agree with the illustrious Pallas, who upon this very subject thus writes:—"*Ill.* Linnæus, qui primus generi nostro *Aphroditæ* nomen indidit, in prioribus 'Systematis Naturæ' editionibus hanc solam speciem, nomine *A. nitentis*, recensere solebat; eodemque eam titulo in 'Faun. Su.' ed. 1, n. 1284, in 'Mus. Adolpho-Frid.' vol. i. p. 43, inque 'Amœnitat. Acad.' vol. i. p. 326 habet. In 'Systematis Naturæ,' decima editione vero *A. aculeatæ* nomine eam distinxit, quod in altera Faunæ editione, n. 2199, servavit, et quo etiam ego, novandi minime cupidus, tantisper hic utar."—*Miscell. Zool.* p. 78.

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* Aphrodite (Ἀφροδιτη) is the Greek name for Venus. Linnæus, who first established the genus, named it *Aphrodita*. Many succeeding authors, considering the termination to be not strictly classical, write it *Aphrodite*; but as the former is merely the Doric method of spelling the word, and as it is therefore not strictly incorrect, I adopt the Linnæan name.

The Sea-Mouse is so well known that it is unnecessary here to describe it. It has, from its brilliant iridescent colours, been the admiration of all observers. "The *Aphrodita aculeata*," says Linnæus, "reflecting the sunbeams from the depths of the sea, exhibits as vivid colours as the peacock itself, spreading its jewelled train." Cuvier, in his 'Règne Animal,' says that from its sides spring "bundles of flexible bristles, shining brilliantly with all the splendour of gold, and changing into all the hues of the rainbow. They do not yield in beauty either to the plumage of the humming-bird or to the most brilliant of the precious stones." "L'or, l'azur, le pourpre, le vert," say MM. Audouin and Milne-Edwards, in their 'Hist. Nat. du Littoral de la France,' p. 33, "se nuancent à leur surface de mille manières, et ces couleurs, souvent irisées, se trouvent dans une harmonie parfaite avec les reflets chatoyans et successifs des anneaux de leur corps. L'aile du Papillon n'a pas reçu une plus brillante parure que ces vers cachés au fond des eaux, et enfoncés quelquefois dans un limon noir et boueux."

There are many specimens in the collection of the British Museum, varying from 7 or 8 inches to 1 inch in length.

It is common in the coralline region, on almost all our British coasts, on the coast of France, on those of Holland, Sweden, Norway, N. America, and even, it is said, in the Baltic and Mediterranean. (Mus. Brit.)

Sp. 2. APHRODITA SERICEA.

Halithea sericea, *Savigny, Syst. Annelid.* p. 19.

This is looked upon as a rather doubtful species by Audouin and Milne-Edwards, and Grube considers it as in all probability only a smaller variety of *A. aculeata.* The splendidly iridescent hairs, however, are wanting in this species, instead of which these appendages are white, while the spines on the dorsal branch of the feet are of a fine green. Savigny gives no habitat for this species, and no author has recorded its appearance since his time. A specimen, however, exists in the Paris Museum.

Sp. 3. APHRODITA BOREALIS, *Johnston* in *Ann. Nat. Hist.* vol. iv. p. 370, t. 10. fig. 1–13, and *Catalogue of British Non-parasitical Worms in the British Museum,* p. 104, tab. 10. f. 1–13.

This is a very small species, and we have only one specimen existing in the collection of the British Museum. It certainly belongs to the restricted genus *Aphrodita,* and has been considered by Grube to be synonymous with Risso's *Halithea aurata* from the South of Europe. Risso's description, however, is so vague and unsatisfactory, that I find it impossible to identify it with any species I have yet seen.

The *A. borealis* is a native of the seas of Scotland, having been taken by Dr. Johnston in Berwick Bay. (Mus. Brit.)

Sp. 4. APHRODITA ALTA, *Kinberg, Ofversigt af Kongl. Vetenskaps-Akademiens Förhandlingar,* 1855, p. 381; *Fregatten Eugenies Resa,* p. 2, tab. 1. fig. 1, 1 A–1 H.

Kinberg states the size of this species to be 27 millim. long; and he mentions that the hairs of the ventral branch of the feet are short and white.

It was taken in the South Atlantic, near Rio Janeiro, at a depth of from 20 to 30 fathoms.

Sp. 5. APHRODITA LONGICORNIS, *Kinberg, l. c.* p. 382; *Fregatt. Eugen. Resa,* p. 4, tab. 1. fig. 3, 3 B–3 F.

This species differs from the last in having the hairs on the ventral branch of the feet of a brassy-green hue, and in the tentacle on the cephalic lobe being very long. Kinberg mentions the size to be that of the *A. aculeata,* and says it was taken in the South Atlantic Ocean, off the mouth of the River Plate.

Sp. 6. APHRODITA AUSTRALIS, sp. nov.

Body ovate oblong, 3½ to 4 inches long, and from 1¾ to 2 inches broad, narrower posteriorly, convex on the back, which is covered with a thick felty substance, consisting of a thinnish membrane and numerous fine hairs matted together, concealing the elytra;

head-lobe small, rounded; tentacle very short; palpi of considerable length, yellowish. Feet-bearing segments of body 42, feet 42 pairs, biramous, ventral branch strong and much corrugated, obtusely rounded at extremity, inferior cirrus rather strong and of considerable size. Bristles of this branch strong, of a bronzed colour, simple, disposed in two fascicles, of which the inferior are short and lighter coloured, the superior much stronger and not numerous. Upper or dorsal branch of feet furnished with two fascicles of bristles; the lower consisting of very numerous, simple, and slender hairs, presenting, as in *A. aculeata*, an iridescent fringe along the sides, but not nearly so beautiful as in the European species, being more of a bronzed metallic hue. The upper fascicle of bristles penetrate the felty covering, and lie down on the back. They are very long, each being at least 14 lines in length. They are of a pale colour with a slightly metallic hue, become slender at the extremity, and are simple. The dorsal cirri are stout, setaceous, and white. The ventral surface of the animal is brownish-coloured and rough, with very numerous, small points or projections.

This species resembles very much the European species *A. aculeata*, and is evidently the Australian representative of our common Sea-Mouse. We have two specimens in the collection, one from Port Lincoln, collected and presented by Mr. George French Angas, and another (in bad condition, unfortunately) from Van Dieman's Land.

Hab. Australian Seas. (Mus. Brit.)

Genus II. HERMIONE, *Blainville, Dict. Sc. Nat. art. Vers.* vol. lvii. p. 457.

Halitheæ Hermionæ, *Savigny, Syst. Annelid.* p. 20.

Eyes peduncled, the peduncles attached under the margin of the head; back more or less free from covering. Elytra bearing feet armed with barbed bristles on dorsal branch; bristles of ventral branch few and bidentate or forked.

Savigny, Blainville, Audouin and Milne-Edwards, Johnston, Grube, and others, all give as a decided character of the genus *the back being naked* and showing the elytra, instead of being covered with a felty coat. This, however, I consider to be a character upon which not much reliance is to be placed, as in the first species, *Hermione hystrix*, we have a specimen in the collection brought by Mr. M'Andrew from the Canaries, in which the back is entirely covered with a thin coat of matted hair and membrane, which completely conceals the elytra from view; and in another species (to be here described), which evidently belongs to this genus, the back is also covered with a coat composed of matted hairs. This character must therefore be modified as I have given it in the diagnosis.

Savigny, in his System of Annelides, placed the species upon which the genus was founded in a tribe, which he designates *Halitheæ Hermionæ*. De Blainville was the first who formed the genus, and called it, in accordance with the indication of Savigny, *Hermione*.

Sp. 1. HERMIONE HYSTRIX.

Halithea hystrix, *Savigny, Syst. Annelid.* p. 20.

In general the elytra of this species are quite or nearly exposed; but, in all the specimens I have examined, the feet are more or less covered with sordes, apparently the remains of a felty coat which most probably clothed the whole back; and, as I have mentioned above, we have one specimen from the Canaries, the whole back of which is covered with the same material. The *H. hystrix* is a native of the seas of Europe, and occurs pretty commonly on our own coasts. (Mus. Brit.)

Sp. 2. HERMIONE HYSTRICELLA, *Quatrefages*; *Cuv. Règn. An., edit. Croch., Annelides*, t. 19. f. 1. 1*a–f.*; *Kinberg, l. c.* p. 382.

A figure only of this fine species is given by Milne-Edwards in the work just quoted, and he refers for a description to an unpublished work upon the *Annelides* by M. Quatrefages; but Kinberg, who appears to have seen the species, gives a description of it in his paper in the Swedish Transactions, and a figure in the 'Fregatt. Eugen. Resa.' It is nearly allied to the preceding, but excels it in colours. According to Kinberg, it inhabits the Mediterranean on the coast of Syria.

Sp. 3. HERMIONE CHRYSOCOMA, sp. nov.

Body elongate-ovate, of about 12 or 13 lines long, and at the broadest part about 5 lines in diameter. The back is covered with a thin skin, composed, as in other species, of a fine matted felt of delicate brown hairs. Head small; eyes peduncled; tentacle small; palpi short, setaceous, brownish-coloured. Scales thin, overlapping each other on the dorsal surface. The feet appear to be 32 pairs; but those at each extremity are so small that it is difficult to count them satisfactorily. They are, as usual, biramous and furnished with two kinds of bristles. Those on the dorsal branch are rather long, and of a golden-brown colour. They are all of similar form, are curved, and somewhat flattened like the blade of a scimitar at the upper half of their length, and strongly toothed on the convex edge for some distance along the upper portion. These teeth are about 14 or 15 in number, and the last, which forms the point, is longer than the others, and sharp pointed. The bristles of the ventral branch are shorter and rather darker coloured than those of the dorsal branch, and are bidentate or forked at the extremity, the teeth which form the lower part of branch being short and stout. Both branches of feet are stout and blunt-pointed. The under surface of the body is dark brown, and roughened with numerous raised vesicular points. The upper cirri are small; the inferior are short.

This species may possibly be the *Halithea aurata* of Risso; but, as I have said before, Risso's species cannot be determined, and as the particular locality where our specimen (there is only one) was found is not specified, I think it better to distinguish it by a new name.

Hab. South of Europe. Collected by the late P. B. Webb, Esq., joint author of the 'Natural History of the Canaries.' (Mus. Brit.)

Genus III. APHROGENIA, *Kinberg, Öfversigt Kongl. Vetenskaps-Akademiens Förhandlingar*, 1855, p. 382.

Eyes sessile, placed upon the basal part of the tentacle, lateral; no felty covering on the back. Bristles of the dorsal branch of the feet uncinate, not barbed; those of the ventral branch few in number, bidentate.

I have not seen any species belonging to this genus. Kinberg describes only one.

Sp. 1. APHROGENIA ALBA, *Kinberg, l. c.*; *Fregatt. Eugen. Res.* p. 6, tab. 2. fig. 6, 6 A–6 H.

This is a native of the seas of the West Indies, having been collected at the island of St. Thomas by M. Werngren.

Genus IV. LÆTMATONICE, *Kinberg*; *Fregatt. Eugen. Resa*, p. 7.

Lætmatonice, *Kinberg, Öfversigt Kong. Vet. Akad.* 1855, p. 382.

Eyes supported on peduncles which spring from the anterior margin of the cephalic lobe; back covered with a felty coat; bristles of elytra-bearing feet barbed, those of ventral branch semipennate.

Sp. 1. LÆTMATONICE FILICORNIS, *Kinberg*; *Fregatt. Eugen. Resa*, p. 7, tab. 3. fig. 7, 7 A–7 H.

Lætmatonice filicornis, *Kinberg, Öfversigt Kong. Vet. Akad.* 1855, p. 382.

This species I do not know; it is a native of the western and northern coasts of Sweden.

Sp. 2. LÆTMATONICE KINBERGI, sp. nov.

Body oval, from 12 to 15 lines long, and from 4 to 5 in breadth at thickest part. Back covered with a felty coat composed of a thin membrane and numerous fine hairs matted together, which are generally obscured with sordes, but when cleaned from it are smooth and simple, colourless, and not very numerous. Head-lobe constricted in the middle by a deep groove on each side. Tentacle short and conical. Palpi white, long, and setaceous. Elytra 15 pairs, oval, thin, membranous-looking, and smooth, overlapping each other the whole length of the back. Cirri rather long and club-shaped at the extremity. Feet 30 pairs, biramous; branches widely apart. Dorsal branch rounded and rather short; the bristles issuing from it, about ten or twelve in number, long, apparently furnished with a loose joint at about the upper third of its length. They are of a bronzed brown colour, and barbed near the extremity, which is straight and sharp pointed. The ventral branch of the foot is long, conical, obtuse-pointed, and the bristles issuing from it, about five or six in number, are of considerable length, though much shorter than those of dorsal branch. They are more slender also, are curved at the point, have a tooth at some distance from the extremity, and between the teeth and point are rather densely plumose or feathered. The edges of this ventral branch, and indeed the whole surface, are beset with a number of rounded vesicular bodies, placed on short pedicels. The under surface of the body is greyish-coloured, and covered all over with small vesicles, which give it a rough appearance.

This species of *Aphrodita* resembles in general appearance the *Aphrodita borealis* of Johnston; but the fascicle of bristles of the ventral branch of the foot and those of the dorsal also are totally different from those figured by Dr. Johnston. In the latter species also the elytra are quite different. In the figure of *A. borealis* given by Dr. Johnston they do not nearly meet on the middle of the back, while in the present species they overlap each other along the whole length of the dorsal surface. It differs chiefly from *L. filicornis* of Kinberg in the length of the tentacle, and the shape of the cephalic lobe.

Hab. Dredged in considerable numbers in the North Sea, off the Shetland Islands, by J. G. Jeffreys, Esq., in July 1864. (Mus. Brit.)

Family II. IPHIONIDÆ.

(Iphionea, *Kinberg*; Polynoæ Iphionæ, *Savigny*.)

Facial tubercle small, placed between two antennæ, which are produced from the surface of the face; no tentacle; palpi thick; tentacular and buccal cirri slender; elytra reticulated.

There is only one genus as yet belonging to this family, which Kinberg, adopting the divisional denomination indicated by Savigny, has named *Iphione*. The typical species is the *Polynoë muricata* of Savigny, so beautifully represented by that author in his great work on Egypt.

Genus IPHIONE, *Kinberg, l. c.* p. 383.

Polynoë Iphione, *Savigny, Syst. Annelid.*

Eyes four, sessile; cephalic lobe produced from between the basal joints of the antennæ, which are longer than the lobe itself; elytra 13 pairs. The setæ of the dorsal branch of feet are fine subulate hairs: bristles of ventral branch placed close to them, and serrate.

Sp. 1. IPHIONE MURICATA.

Polynoë muricata, *Savigny, l. c.* Atlas, tab. 3. figs. 1, 1. i., 1. ii.

This is a well-marked species, and resembles at first sight a species of *Chiton*, with which, as Savigny says, it is often confounded as it creeps slowly upon the stones under the water. It is a native of the shores of the Red Sea, as also of the coast of the Isle of France (*Mus. Brit.*).

Sp. 2. IPHIONE OVATA, *Kinberg, l. c.* and *Fregatt. Eugen. Resa*, p. 8, tab. 3. figs. 8, 8 A–8 E.

I have not seen this species, but it appears quite distinct. Kinberg says it is a native of the Pacific Ocean, having been taken at Honolulu, one of the Sandwich Islands.

Sp. 3. IPHIONE SPINOSA, *Kinberg, Fregatt. Eugen. Resa*, p. 8, tab. 10. fig. 46.

Hab. Port Natal, *Wahlberg*.

Family III. POLYNOIDÆ.

(Polynoina, *Kinberg*, Polynoæ simplices, *Savigny*.)

No facial tubercle; tentaculum in general long; two antennæ; jaws large and horny; eyes four in number; elytra 10 (?) or 12 to 35 pairs; segments of body not bearing elytra, furnished with a dorsal cirrus; no branchiæ.

Genus I. LEPIDONOTUS, *Leach* (s. str. *Kinberg*).

Bases of antennæ produced from the anterior margin of the cephalic lobe; 12 (–13 ?) pairs of elytra, covering the back wholly; body short.

Sp. 1. LEPIDONOTUS SQUAMATUS.

Aphrodita squamata, *Linnæus, Syst. Nat.* 10th ed. p. 655.

The *Aphrodita punctata* of Müller, *A. clavigera* of Freminville, and *Polynoë scutellata* of Risso are either identical with or mere varieties of this species.

This well-known European species may be taken as the type of the genus.

Hab. Northern Seas, British coasts, coast of France and Mediterranean (*Mus. Brit.*).

Sp. 2. LEPIDONOTUS CLAVA.

Aphrodita clava, *Montagu, Linn. Trans.* ix. 108, tab. 7. fig. 3.

This species was first made known by Montagu, and since then has been more fully described by Dr. Johnston in his lately published, posthumous "Catalogue of British non-parasitical Worms in the Collection of the British Museum."

Hab. Southern coasts of England—Devon, Cornwall, &c. (*Mus. Brit.*).

Sp. 3. LEPIDONOTUS POMAREÆ, *Kinberg, l. c.* p. 383; and *Fregatt. Eugen. Resa*, p. 10, tab. 3. figs. 9, 9 A–9 H.

Hab. Tahiti, *Kinberg.*

This and the following nine species have been described by Kinberg as belonging to the genus *Lepidonotus*, as restricted by him. I have not had an opportunity of seeing any of them.

Sp. 4. LEPIDONOTUS SOCIALIS, *Kinberg, l. c.*, and *Fregatt. Eugen. Resa*, p. 10, tab. 3. figs. 10, 10 B–10 G.

Hab. Island of Eimeo, in the Pacific Ocean, *Kinberg.*

Sp. 5. LEPIDONOTUS JACKSONI, *Kinberg, l. c.* and *Fregatt. Eugen. Resa*, p. 11, tab. 3. figs. 11, 11 B–11 H.

Hab. Port Jackson, *Kinberg.*

Sp. 6. LEPIDONOTUS MARGARITACEUS, *Kinberg, l. c.*, and *Fregatt. Eugen. Resa*, p. 11, tab. 3. figs. 12, 12 A–12 H, tab. 10. fig. 49.

Hab. Guayaquil, South America, *Kinberg.*

Sp. 7. LEPIDONOTUS JOHNSTONI, *Kinberg, l. c.* 384, and *Fregatt. Eugen. Resa*, p. 12, tab. 4. figs. 13, 13 A–13 H, tab. 10. fig. 50.

Hab. Islands near to Panama, *Kinberg.*

Sp. 8. LEPIDONOTUS WAHLBERGI, *Kinberg, l. c.* and *Fregatt. Eugen. Resa*, p. 12, tab. 4. figs. 14, 14 A–14 H.

Hab. Port Natal, *Wahlberg.*

Sp. 9. LEPIDONOTUS CÆRULEUS, *Kinberg, l. c.*, and *Fregatt. Eugen. Resa*, p. 13, tab. 4, figs. 15, 15 B–15 H.
Hab. Rio Janeiro, *Kinberg*.

Sp. 10. LEPIDONOTUS HAVAICUS, *Kinberg, l. c.*, and *Fregatt. Eugen. Resa*, p. 14, tab. 4. figs. 17, 17 A–17 H.
Hab. Honolulu, Pacific Ocean, *Kinberg*.

Sp. 11. LEPIDONOTUS STRIATUS, *Kinberg, l. c.*, and *Fregatt. Eugen. Resa*, p. 14, tab. 4. figs. 18, 18 B–18 H.
Hab: Port Jackson, *Kinberg*.

Sp. 12. LEPIDONOTUS INDICUS, *Kinberg, l. c.*, and *Fregatt. Eugen. Resa*, p. 15, tab. 4. figs. 19, 19 A–19 H, tab. 10. fig. 52.
Hab. Straits of Banka, *Kinberg*.

Sp. 13. LEPIDONOTUS SAVIGNYI.
Polynoë Savignyi, *Grube, Annulata Oerstediana*, p. 19.
Hab. Callao, *H. Kröyer*.

This and the following species were described by Grube in his enumeration of species of *Annelides* in the collections of Oersted and Kröyer. I have not seen either of them.

Sp. 14. LEPIDONOTUS TOMENTOSUS.
Polynoë tomentosa, *Grube, l. c.*
Hab. Puntarenas, Costa Rica, *Oersted*.

Sp. 15. LEPIDONOTUS FUSCICIRRUS.
Polynoë fuscicirra, *Schmarda, Neue wirbellose Thiere*, ii. p. 152. tab. 36. fig. 311.
Hab. Bay of Belligam, island of Ceylon, *Schmarda*.

This and the two following species are described and figured by Schmarda in his description of new species of Annelides discovered by him in his voyage round the world. I only know them from Schmarda's figures and descriptions.

Sp. 16. LEPIDONOTUS POLYCHROMA.
Polynoë polychroma, *Schmarda, l. c.* p. 153, t. 36. f. 307.
Hab. East coast of New Zealand, *Schmarda*.

Sp. 17. ? LEPIDONOTUS ANTILLARUM.
Polynoë Antillarum, *Schmarda, l. c.* p. 158.
Hab. Port Royal, Jamaica, *Schmarda*.

This species is rather loosely described by Schmarda; so that it is difficult exactly to place it in its proper genus. Schmarda himself says that he was not able to determine its proper place.

Sp. 18. LEPIDONOTUS IMPATIENS.

Polynoë impatiens, *Savigny, Syst. Annelid.* 24; Atlas, t. 3. fig. 2.

Hab. Red Sea, *Savigny*.

Sp. 19. LEPIDONOTUS GLAUCUS.

Polynoë glauca, *Peters, Monatsbericht der königl. Preuss. Akad. der Wissenschaft. Berlin*, 1854, p. 610.

Hab. Haven of Mossambique, *Peters*.

Sp. 20. LEPIDONOTUS CLYPEATUS.

Polynoë clypeata, *Grube, Archiv für Naturg.* 1860, p. 71, t, 3. f. 1.

Hab. Mediterranean, Adriatic and near the Scilly Islands, *Grube*.

Sp. 21. LEPIDONOTUS SEMITECTUS.

Lepidonota semitecta, *Stimpson, Proceedings of Academy of Natural Sciences of Philadelphia*, 1855, vol. vii. p. 393.

Hab. Simon's Bay, Cape of Good Hope.

Sp. 22. LEPIDONOTUS SINCLAIRI, sp. nov.

Head-lobe rather small; tentacle unfortunately broken, only the base remaining. Antennæ produced from the anterior margin of cephalic lobe, dark-coloured at their bases, which are the only parts remaining. Palpi stout, white, setaceous, and smooth. Elytra 12 pairs, pale-coloured, mottled with black; rounded, thin, covered all over with minute points, with some larger, raised, and rounded punctations intermixed; ciliated on outer margin. Back completely covered. Feet biramous: ventral branch the larger of the two, with a fascicle of yellow bristles, stout, slightly curved at the point, and serrated a short distance below the apex. Dorsal branch small; bristles short, slender, sharp-pointed, and minutely serrated nearly their whole length. Dorsal cirri conical, setaceous, smooth; anal cirri rudimentary.

Length about 9 lines; breadth 2 lines.

Hab. New Zealand. Named after the late Dr. Andrew Sinclair, to whom we are indebted for the only specimen we possess (*Mus. Brit.*).

Sp. 23. LEPIDONOTUS OCULATUS, sp. nov.

Animal about 1½ inch long, and, including the setæ, about ½ an inch broad, nearly equal in breadth at each extremity. It is of a light-yellow colour.

Head rather small; tentacle and antennæ rather short, of nearly equal length, club-shaped near extremity, which terminates suddenly in a slender point. Palpi stout, conical, setaceous, only a little longer than the tentacle and antennæ. Feet stout, biramous. Bristles of dorsal branch few in number, short, straight, sharp-pointed, and finely striated across. Those of ventral branch are more numerous, much stronger, slightly curved at the point, but becoming broader near the extremity, where it is serrated, the teeth of the serrations being long and prominent. The elytra are 12 pairs, rather rounded, extending laterally beyond the body; smooth on the edges, roughly tuberculated on the surface, and near the centre marked with a large, round, black spot, like an eye. Dorsal cirri of considerable length, incrassated or club-shaped beneath the extremity, which is marked by a black ring, and, like the tentacle and palpi, terminates suddenly in a sharp point. Ventral cirri nearly reaching the extremity of the ventral branch of the foot, slightly incrassated beneath the extremity, which terminates in a fine point. Anal cirri of considerable length, and, like the dorsal cirri, club-shaped near the extremity, black-ringed and sharp-pointed.

Hab. Australia (*Mus. Brit.*).

For our specimen we are indebted to Dr. Bowerbank, who obtained it from the seas of Australia.

Sp. 24. Lepidonotus stellatus, sp. nov.

This animal is about 8 lines in length, and 3 in breadth. The dorsal surface and elytra are of a somewhat uniform olive-colour. The ventral surface is yellow. Head rather small; tentacle unfortunately destroyed. Antennæ slender, rather short; palpi stout, conical, short, about the same length as the antennæ. Feet stout, biramous; bristles of ventral branch longer than those of the dorsal, bidentate at the point, and serrated a little below its apex. Bristles of dorsal branch short, straight, and serrated throughout their whole length. Dorsal cirri about the length of the feet and bristles, setaceous. Elytra 12 pairs in number, oval, marked across one half with two divaricating rows of pustules. When seen under the microscope, each scale is very prettily marked with numerous lucid dots ranged in rounded spots, like stars. The margins are quite smooth. Segments of body 26 in number; last segment terminated by two short anal cirri.

Hab. Australia (*Mus. Brit.*).

For a specimen of this species we are indebted to Dr. Bowerbank, who received it from the Australian Seas.

Sp. 25. Lepidonotus Bowerbankii, sp. nov.

Animal 6 lines in length, and about 2 broad. The colour is greyish on the back, and yellow underneath. Head, antennæ, and palpi much the same as in preceding species (*L. stellatus*). The bristles of the ventral branch are not bidentate at the point, but are more loosely or longly toothed or serrated below the apex. The bristles of the dorsal branch are slender, and finely serrated and striated across. The elytra are 12 pairs in number, the upper ones nearly round, becoming more ovate as they descend. When seen by the microscope, the surface is covered over with very minute granulations, and the external margin is densely ciliated. They are of a light colour, but speckled all over with light fawn-coloured spots.

Hab. Australia (*Mus. Brit.*).

For a specimen of this species we are indebted to Dr. Bowerbank, who received it from the Australian seas.

Genus II. HALOSYDNA, *Kinberg, l. c.* 384.

Bases of antennæ produced from the anterior margin of the cephalic lobe; elytra from 15 to 35 pairs (15 to 21, Kinberg) not covering the whole of the back; body long.

Sp. 1. HALOSYDNA BREVISETOSA, *Kinberg, l. c.* 385, and *Fregatt. Eugen. Resa*, p. 18, tab. 5. figs. 25, 25 A–25 H.

Hab. Coast of California, *Kinberg*, *Cuming* (*Mus. Brit.*).

This is a very pretty species, and we are indebted to Mr. Cuming for our specimens.

Sp. 2. HALOSYDNA VIRGINI, *Kinberg, l. c.* 384, *Fregatt. Eugen. Resa*, p. 15, tab. 5. figs. 20, 20 A–20 H, tab. 10. fig. 53.

Hab. Honolulu, Sandwich Islands, *Kinberg*.

Sp. 3. HALOSYDNA AUSTRALIS, *Kinberg, l. c.* 385, and *Fregatt. Eugen. Resa*, p. 16, tab. 5. figs. 21, 21 A–21 H, tab. 10. fig. 54.

Hab. Mouth of the River Plate, South America, *Kinberg*.

Sp. 4. HALOSYDNA PATAGONICA, *Kinberg, l. c.* 385, and *Fregatt. Eugen. Resa*, p. 17, tab. 5. figs. 23, 23 A–23 H.

Hab. York Bay, Straits of Magellan, *Kinberg*.

Sp. 5. HALOSYDNA PARVA, *Kinberg, l. c.* 385, and *Fregatt. Eugen. Resa*, p. 17, tab. 5. figs. 24, 24 A–24 H.

Hab. Valparaiso; Chincha Islands; San Lorenzo, near Callao, *Kinberg*.

Sp. 6. HALOSYDNA BRASILIENSIS, *Kinberg, Fregatt. Eugen. Resa*, p. 16, tab. 5. figs. 22, 22 A–22 H.

Hab. Rio Janeiro, *Kinberg*.

Sp. 7. HALOSYDNA LONGICIRRA.

Polynoë longicirra, *Schmarda, Neue wirbell. Thiere*, ii. 152, t. 36. fig. 309.

Hab. Near Belligam, island of Ceylon, *Schmarda.*

Sp. 8. HALOSYDNA LOBOCEPHALA.

Polynoë lobocephala, *Schmarda, l. c.* 157, t. 36. fig. 314.

Hab. Port Royal, Jamaica, *Schmarda.*

Sp. 9. HALOSYDNA GELATINOSA.

Polynoë gelatinosa, *Sars, Beskrivelser*, p. 63, tab. 9. fig. 25.

Hab. Bergen, coast of Norway, *Sars.*

Sp. 10. HALOSYDNA MÜLLERI.

Polynoë Mülleri, *Grube, Annulata Oerstediana*, p. 22.

Hab. Valparaiso, *Kröyer.*

Sp. 11. HALOSYDNA PUNCTULATA.

Polynoë punctulata, *Grube, l. c.* p. 23.

Hab. Rio Janeiro, *Kröyer.*

Sp. 12. ? HALOSYDNA CLAVATA.

Polynoë clavata, *Grube, l. c.* p. 22.

Hab. Christianstad, isle of Santa Cruz, West Indies, *Oersted.*

Sp. 13. ? HALOSYDNA IMBRICATA.

Aphrodita imbricata, *Linnæus, Syst. Nat.* edit. 12, p. 1084 (*fide Johnston, Cat. Brit. Non-parasit. Worms*, p. 118).

Sp. 14. ? HALOSYDNA FLOCCOSA.

Polynoë floccosa, *Savigny, Syst. des Annélides*, 23.

Hab. West coast of France, *Savigny.*

Sp. 15. ? HALOSYDNA CHILENSIS.

Polynoë Chilensis, *Blanchard, Gay's Historia fisica y politica de Chile*, tom. iii. p. 15, *Atlas, Anillados*, tab. 1. figs. 1, 1*a*.

Hab. San Carlos, coast of Chiloe, *Gay.*

Sp. 16. ? HALOSYDNA VIRENS.

Polynoë virens, *Blanchard, l. c.* p. 16, tab. 1. fig. 2.

Hab. Calbuco, coast of Chiloe, *Gay.*

I quote these two species with doubt as to their true generic position, because the figures do not correspond with the descriptions. In *Polynoë chilensis*, M. Blanchard describes the number of elytra as being 16 pairs, "covering the back entirely." In his figure he depicts the animal as having 29 pairs of elytra, which leave the back naked in the centre! In *P. virens* he describes the animal as having 35 pairs of elytra, while he figures it as possessing 56 or 57!

Sp. 17. HALOSYDNA MALLEATA.

Polynoë malleata, *Grube, Archiv f. Naturg.* 1855, p. 81.

Hab. Trieste, *Grube.*

Sp. 18. HALOSYDNA TUTA.

Polynoë tuta, *Grube, l. c.* p. 82.

Hab. Sitka, *Grube.*

Sp. 19. HALOSYDNA VITTATA.

Polynoë vittata, *Grube, l c.* p. 82. 3.

Hab. Sitka, *Grube.*

In the 'Zoological Proceedings' for April 1863, I described four species of *Lepidonotus*, collected at Vancouver Island by J. K. Lord, Esq., naturalist attached to the British North American Boundary Commission. They were also figured for the Report to be issued by that commission, which, however, has not yet been published.

Owing to a slight mutilation of some of the parts, the descriptions of these species were in some respects slightly incorrect and in others deficient in precision. They all belong to the subgeneric group designated *Halosydna* by Kinberg; and I take the opportunity now afforded me of a more minute re-examination, to give a somewhat more detailed account of them. This examination has also enabled me to alter one of the generic characters as given by Kinberg. This author states distinctly the number of elytra to be from fifteen to twenty-one. The interesting species, however, *H. Lordi*, possesses thirty-five pairs of elytra; and as in other respects it agrees in generic characters with *Halosydna*, I conclude that the exact number of elytra is not a certain character, and only proves that Kinberg had not examined any species which was furnished with a larger number than twenty-one.

Sp. 20. HALOSYDNA INSIGNIS.

Lepidonotusinsignis, *Baird, Proc. Zool. Soc.* April 1863.

This species is rather more than 3 inches long, and is nearly ½ an inch in breadth, exclusive of the setæ of the feet. The head is small, and the anterior eyes are larger than the posterior. The proboscis is large and wrinkled, and the jaws are of a reddish-brown colour. The tentacle is rather club-shaped, blunt at the tip, and ringed with black. The antennæ, which are produced from the anterior margin of the cephalic lobe, are a little shorter than the tentacle, are slightly incrassated below the point, ringed with black, and terminate in a fine white setaceous point. The palpi are conical, white, setaceous at the extremity, and are very long, being at least three times the length of tentacle or antennæ. The buccal cirri are about the same length as the antennæ, and are ringed with black and white. The body on the dorsal surface is of a whitish colour, marbled with black. The sides, which are covered by the elytra, are white; and a broad, black, interrupted line runs along the back, throughout its whole length. The under or ventral surface of the body is of a bluish-black colour, and a narrow uninterrupted white line runs down through the centre. The elytra are 18 pairs in number, are oval, white, with black dots on the outer sides and centre, and marked with a black semicircular patch on the inner side. They do not overlap each other except near the head, being wide apart on the rest of the body, and leaving the middle of the back uncovered. The feet are very prominent, stout, rounded, conical, encircled with fine, black, circular lines, and biramous. The ventral branch is very much the larger, and the bristles are stout and amber-coloured. They are rather long, and terminate in a slightly curved point, beneath which they are for a short distance strongly serrated on both sides. The dorsal branch of the foot is small, and the setæ sent off from it are few in number, of a white colour, short, straight, and very finely serrated on each margin. The dorsal cirrus is tolerably long and sharp-pointed; it is pedunculated, the peduncle being stout, conical, and of a deep black colour. The ventral cirrus is short, conical, and sharp-pointed; and at the base of each foot there is a blunt papilla at each corner, of the same dark colour as the under surface of the body. The anal cirri are short, but tolerably stout, and ringed with black and white.

Hab. Esquimalt Harbour, Vancouver Island, *J. K. Lord* (*Mus. Brit.*).

Sp. 21. HALOSYDNA GRUBEI.

Lepidonotus Grubei, *Baird, Proc. Zool. Soc.* April 1863.

Animal about 2 inches long, and ½ inch broad. Head small, broad: eyes very small, placed obliquely near each other; tentacle unfortunately deficient; the peduncle, however, which remains, is thick and marked at the base, on anterior margin, with a small, round, raised, black spot. Antennæ produced from the anterior margin of cephalic lobe, rather short, somewhat club-shaped and white at the extremity, broadly ringed with black at their base and on anterior portion; palpi conical, thick at the base, of a uniform light-brown colour, except at the tip, which is white, and a little longer than the antennæ. The buccal cirri are longer than the palpi, clubbed at extremity, and ringed with black at the base and at a short distance from the point. The back is partially uncovered by the elytra, and is marked by a broad blotch of black in the centre of each segment, striated or as it were wrinkled across and marked with fainter blotches of a dark colour. The under surface of the body is of a uniform brownish colour. The elytra are 18 pairs in number, are all nearly round, rough on the upper surface with small tubercles, edged by a raised margin, and mottled with black and white. They are smallest at the anterior extremity. The dorsal cirri are clubbed and white at extremity, about equal in length to the feet and bristles; they are pedunculated, and marked with a black spot at the base where they issue from the peduncles, and are ringed with black at a short distance from the point. The inferior cirri are short, and acute at the point. The feet are stout, broad, and biramous. The bristles of ventral branch are disposed in two fascicles, are of a bright yellowish-brown colour, and are all similar in structure. They are uncinate at the point, and at a short distance from it are strongly serrated for a short way down. The dorsal branch of the foot is small, and the bristles of that branch are very short and serrated across for the upper two-thirds of their length. At the base of the feet, where they are attached to the body of the animal, there is a small papilla projecting at one corner, and occurring in each foot.

Hab. Esquimalt Harbour, Vancouver Island, *J. K. Lord* (*Mus. Brit.*).

Sp. 22. Halosydna Lordi.

Lepidonotus Lordi, *Baird, Proc. Zool. Soc.* April 1863.

This species is about 3 inches in length, and rather more than $\frac{1}{3}$rd of an inch in diameter at the broadest part of the body. It tapers gradually from the head to the tail, which is only about $\frac{2}{16}$ths of an inch broad. The colour is of a light brown, a broad line of a much darker brown running along the whole length of the centre of the back. The head is broad and short; the eyes are small, placed obliquely near to each other. The tentaculum and antennæ are very short, about equal in length, and white; the bases of the antennæ are produced from the anterior margin of the head-lobe, and the tentaculum occupies a deep emargination on the front of the lobe. The palpi are stout, short, conical, of a light colour, but close to the point ringed with black, the point itself being quite white. They are a little longer than the tentaculum and antennæ. The feet are tolerably stout; the two divisions of which they are composed placed very close to each other. The bristles of the elytra- and cirri-bearing feet are similar in structure; those of dorsal or upper division stout, smooth, somewhat curved as they approach the point, enlarged and flattened and uncinate at the point; those of ventral or lower division a little more slender, slightly enlarged near the point, which is straight, blunt, and striated across. The bristles of both bundles are nearly of equal length, and two or three similar to those of ventral division are mixed up with the bundle of bristles of dorsal division. The two spines are stout, rather long, straight, and blunt-pointed. All these organs are of a yellow colour. The dorsal cirri are white, rather short, about equal in length to the foot itself; the ventral cirrus very short. The elytra are 35 pairs in number, thin, membranous, and of a light brown colour. The anterior pair overlap each other slightly in the centre of the back; but for the rest of the length of the body the middle portion of the back is uncovered.

Hab. Vancouver Island, *J. K. Lord* (*Mus. Brit.*).

A good many specimens of this interesting species were taken by Mr. Lord at Macaulay's Point, Vancouver Island; and they were all found nestling under the shell, and occasionally coiling themselves under the foot of the animal of the *Fissurella cratitia.* I have named it after its discoverer, J. K. Lord, Esq.

Sp. 23. HALOSYDNA FRAGILIS.

Lepidonotus fragilis, *Baird*, *Proc. Zool. Soc.* April 1863.

This species appears, from a re-examination of the specimens in the collection, to belong to the genus *Halosydna* of Kinberg. It is exceedingly brittle, and, owing to the specimens brought home by Mr. Lord being broken into several pieces, it is impossible to describe the species accurately. The head is rather small, and the eyes are placed obliquely, but not very near to each other. The tentaculum and antennæ, with the palpi and buccal cirri, are all short, nearly of equal length, and almost white or colourless.

The elytra are very deciduous, and appear to be numerous, and to leave the centre of the back uncovered; but it is impossible to state the number, as it is extremely difficult to be able to fit the fragments into which the body is broken to the respective individuals. The whole body of the worm appears destitute of any markings or colour. The feet are moderate in size and are biramous. The ventral branch is much the larger, and the bristles belonging to it are of a light amber-colour, uncinate or hooked at the point, but quite smooth and not toothed or serrate on the edges. The dorsal branch is very small, and the bristles are short, straight, and simple, not toothed or serrate on the edges. The dorsal cirri are stout and club-shaped at the extremity, to which is appended a small flagellum, or narrow, loosely floating process. They appear to become nearly obsolete on the feet of the lower portion of the body. The ventral cirri are so exceedingly small as to be scarcely perceptible. The length of the species, judging from the fragments, might be about 2½ inches, and the breadth about 4 lines.

Hab. Esquimalt Harbour, Vancouver Island, *J. K. Lord* (*Mus. Brit.*).

This species was found by Mr. Lord adhering to a large species of Starfish; but he says in his notes, "It is next to impossible to obtain one perfect, as they break themselves to pieces on the slightest touch, or however carefully killed."

Genus III. ANTINOË, *Kinberg*, *l. c.* 385.

Bases of antennæ fixed under the margin of the emarginated cephalic lobe, close to the tentacle; elytra 12–15 pairs, covering the back; body short.

Sp. 1. ANTINOË LÆVIS.

Polynoë lævis, *Aud. & Edw. Littoral de la France*, ii. 85, t. 2. f. 11–19.

Hab. Coast of France, Isle of Chausey, *MM. Audouin and Milne-Edwards* (*Mus. Brit.*).

Sp. 2. ANTINOË PHARETRATA.

Lepidonotus pharetratus, *Johnston, Cat. Non-parasitical Worms in Brit. Mus.* p. 113, t. 3. f. 17–19.

Hab. British coast, *Dr. Johnston, J. G. Jeffreys* (*Mus. Brit.*).

Sp. 3. ANTINOË IMPAR.

Polynoë impar, *Johnston, Ann. Nat. Hist.* ii. 436, t. 22. f. 3–9.

Hab. British coasts, *Dr. Johnston* (*Mus. Brit.*).

The only specimen we possess was taken on the coast of Northumberland.

Sp. 4. ANTINOË SEMISCULPTA.

Lepidonotus semisculptus, *Leach, MS. Johnston; in Catalogue of Non-parasitical Worms in Brit, Mus.*, p. 116.

Hab. South Devon coast, *J. Cranch*; Guernsey, *J. Smith* (*Mus. Brit.*).

Sp. 5. ANTINOË PELLUCIDA.

Lepidonotus pellucidus, *Dyster, MS.; Johnston, l. c.* 117.

Hab. Tenby, *Dyster*.

Sp. 6. ANTINOË ÆQUISETA, *Kinberg, l. c.* 385, and *Fregatt. Eugen. Resa*, p. 19, tab. 6. figs. 27, 27 B–27 G.
Hab. Port Natal, South Africa, *J. A. Wahlberg*.

Sp. 7. ANTINOË WAAHLI, *Kinberg, l. c.* and *Fregatt. Eugen. Resa*, p. 19, tab. 6. figs. 28, 28 A–28 H, tab. 10. fig. 55.
Hab. Port Jackson, *Kinberg*.

Sp. 8. ANTINOË PULCHELLA, *Kinberg, l. c.*, and *Fregatt. Eugen. Resa*, p. 20, tab. 6. figs. 29, 29 A–29 H, tab. 10. fig. 56.
Hab. Mouth of River Plate, South America, *Kinberg*.

Sp. 9. ANTINOË MICROPS, *Kinberg, l. c.* and *Fregatt. Eugen. Resa*, p. 20, tab. 6. figs. 30, 30 B–30 H.
Hab. Rio Janeiro, *Kinberg*.

Sp. 10. ANTINOË SPINIFERA.
Polynoë (Antinoë) spinifera, *Ehlers, die borsten. Würmer*, i. p. 95, tab. 3. f. 1–4.
Hab. Quarnero, Istria, *Ehlers*.

Sp. 11. ANTINOË LONGISETIS.
Polynoë longisetis, *Grube, Archiv für Naturg.* 1863, p. 37, t. 4. f. 1.
Hab. Lussin Island, Adriatic, *Grube*.

Sp. 12. ? ANTINOË TENUISETIS.
Polynoë tenuisetis, *Grube, Annulat. Oerstediana*, p. 20.
Hab. Rio Janeiro, *Kröyer*.

Sp. 13. ? ANTINOË EXANTHEMA.
Polynoë exanthema, *Grube, l. c.*
Hab. Valparaiso, *Kröyer*.

Sp. 14. ? ANTINOË CRUCIS.
Polynoë Crucis, *Grube, l. c.* p. 21.
Hab. Island of Santa Cruz, West Indies, *Oersted*.

Sp. 15. ? ANTINOË LEUCOHYBA.
Polynoë leucohyba, *Schmarda, Neue wirb. Th.* 153, t. 36. f. 308.
Hab. Port Royal, Jamaica, *Schmarda*.

I quote this species with a doubt, because though in its general appearance it agrees with the genus *Antinoë*, yet it possesses 17 pairs of elytra.

Sp. 16. ? ANTINOË VIOLACEA.
Polynoë violacea, *Schmarda, l. c.* 154, t. 36. f. 313.
Hab. Coast of Chili, *Schmarda*.

Sp. 17. ? ANTINOË AUSTRALIS.
Polynoë australis, *Schmarda, l. c.* 154.
Hab. Port Jackson, New South Wales, *Schmarda*.

Sp. 18. ? ANTINOË LOBOSTOMA.

Polynoë lobostoma, *Schmarda, l. c.* p. 155, t. 36. fig. 315.

Hab. Canal of St. Malo, *Schmarda.*

Sp. 19. ? ANTINOË MACROLEPIDOTA.

Polynoë macrolepidota, *Schmarda, l. c.* p. 155, t. 36. fig. 306.

Hab. Auckland Bay, New Zealand, *Schmarda.*

Sp. 20. ? ANTINOË POLYTRICHA.

Polynoë polytricha, *Schmarda, l. c.* p. 156.

Hab. South coast of Jamaica, *Schmarda.*

Sp. 21. ? ANTINOË NEPHROLEPIDOTA.

Polynoë nephrolepidota, *Schmarda, l. c.* t. 36. f. 312.

Hab. East coast of Ceylon, near Trincomalee, *Schmarda.*

I have not seen any of the species described by Grube and Schmarda; and the characters as given by these authors do not enable me to refer them, without considerable doubt, to this generic group. The species *P. leucohyba*, as I have stated above, possesses 17 pairs of elytra, *P. polytricha* 16; and the number of these appendages is not stated by Schmarda in the *P. nephrolepidota.*

Sp. 22. ANTINOË GRANULOSA.

Polynoë granulosa, *Rathke, Faun. der Krym, Mem. Acad. Petersb.* iii. 408.

Hab. Sebastopol, *Rathke.*

Sp. 23. ? ANTINOË FASCICULOSA.

Polynoë fasciculosa, *Blanchard, in Gay's Histor. fisic. y politic. de Chile,* iii. p. 17, *Atlas, Anillados,* pl. 1. fig. 3.

Hab. Chile, *Gay.*

Sp. 24. ANTINOË MARGINATA.

Polynoë marginata, *Grube, Annulat. Oersted.* p. 22.

Hab. Callao, *Kröyer.*

Genus IV. HARMOTHOË, *Kinberg, l. c.* p. 386.

Bases of antennæ fixed under the tentacle, which occupies the notch in front of cephalic lobe; elytra 15 (14 to 15 ?) pairs, covering the back; body not long.

Sp. 1. HARMOTHOË CIRRATA.

Aphrodite cirrata, *Fabricius, Faun. Grœnland.* 308, tab., f. 7.

Hab. British coasts; coast of France, &c. (*Mus. Brit.*).

Sp. 2. HARMOTHOË ASSIMILIS.

Lepidonota assimilis, *Oersted, Annulat. Danicor. Conspect.* p. 13.

Hab. Oresund, coast of Denmark, *Oersted.*

Sp. 3. HARMOTHOË SCABRA.

Aphrodita scabra, *Fabricius, Faun. Grœnl.* 311.

Hab. North Sea (*Mus. Brit.*).

Sp. 4. HARMOTHOË SPINOSA, *Kinberg, l. c.* 386, and *Fregatt. Eugen. Resa*, p. 21, tab. 6. figs. 31, 31 A–31 H, tab. 10. fig. 57.

Hab. Straits of Magellan (*Mus. Brit.*).

We are indebted for a specimen of this species to the Lords of the Admiralty. It was obtained, during the voyage of H. M. ship 'Rattlesnake,' in the Straits of Magellan.

Sp. 5. HARMOTHOË AREOLATA.

Polynoë areolata, *Grube, Archiv für Naturg.* 1860, p. 72, t. 3. fig. 2.

Hab. Mediterranean and Adriatic Seas, *Grube.*

Sp. 6. HARMOTHOË PLUMOSA.

Polynoë plumosa, *Grube, Actinien Echinod. und Würmer des Adriatischen und Mittelmeers*, p. 86.

Hab. Adriatic and Mediterranean Seas, *Grube.*

Sp. 7. ? HARMOTHOË FASCICULOSA.

Polynoë fasciculosa, *Grube, l. c.* 87.

Hab. Adriatic and Mediterranean Seas, *Grube, l. c.* 25.

Sp. 8. ? HARMOTHOË SETOSISSIMA.

Polynoë setosissima, *Savigny, Syst. des Annelid.* 25.

Hab. Havre, *Cuvier.*

Sp. 9. HARMOTHOË NODOSA.

Polynoë nodosa, *Sars, Förhand. Vidensk. Selskab. Christiania,* 1860. p. 58.

Hab. Coast of Sweden, *Sars.*

Sp. 10. HARMOTHOË ASPERRIMA.

Polynoë asperrima, *Sars, l. c.* 59.

Hab. Coast of Sweden, *Sars.*

This species, according to Sars, has 18 pairs of elytra. In other respects it agrees generically with *Harmothoë* as described by Kinberg.

Sp. 11. HARMOTHOË RARISPINA.

Polynoë rarispina, *Sars, l. c.* 60.

Hab. Coast of Sweden, *Sars.*

Sp. 12. HARMOTHOË SCABRIUSCULA.

Polynoë scabriuscula, *Sars, l. c.* 61.

Hab. Coast of Sweden, *Sars.*

Sp. 13. HARMOTHOË UNICOLOR, sp. nov.

Animal elongate-elliptical, narrow, about 1 inch in length, and about 3 lines in breadth, nearly uniform in breadth throughout. Head-lobe broad. Tentacle long, of a dark-brown colour for two-thirds of its length; incrassated near the extremity, which is quite white; and terminating in a long, delicate, white, setaceous point. Antennæ much shorter than the tentacle, but longer than head-lobe, slender, and terminating, like the tentacle, in a long, slender, delicate, white point. Palpi stout, setaceous, not ringed with black and white, and of nearly the same length as the tentacle. Elytra 14 pairs, of a uniform olive-colour, covering the whole of the back, with the exception of five or six of the last articulations, which are naked and spotted with black. The upper elytra are nearly round and small, the others becoming oval and larger as they descend down the back toward the lower extremity. They are sparsely fringed with a few setæ on outer edge, and covered all over with minute spots, which under the microscope appear as very short, blunt setæ, set upon a round pedicle, and having the appearance of the stopper of a wine-decanter. Feet biramous, the bristles of the two branches differing in structure. The ventral bristles are shorter and stouter than the dorsal, scimitar-shaped, slightly uncinate at the point, and strongly serrated on the convex edge for some distance along the upper half. Dorsal bristles rather slender, toothed at the point, and strongly denticulate along both edges for some distance, and somewhat enlarged near the point where the denticulations commence. The dorsal cirri resemble the tentacle and antennæ in structure.

This species strongly resembles the *H. cirrata*, except in the number of elytra (which apparently do not exceed 14 in number), and in their uniform colour.

Hab. Esquimalt Harbour, Vancouver Island, *J. K. Lord.*

Genus V. HERMADION, *Kinberg, l. c.* 386.

Antennæ with their bases attached to the cephalic lobe under the tentacle, which occupies the notch in front; elytra 15 pairs, not meeting on the back, and leaving the middle of the dorsal region and the posterior segments uncovered; ventral setæ serrated below the apex; body elongated.

Sp. 1. HERMADION LONGICIRRATUM, *Kinberg, l. c.* and *Fregatt. Eugen. Resa*, p. 22, tab. 6. figs. 33, 33 A–33 H.

Hab. Straits of Magellan, *Kinberg.*

Though this species is stated by Kinberg only to occur in the Straits of Magellan, we have in the collection a considerable number of specimens brought from various habitats, though all from the South Atlantic Ocean. We have them from Hermit Island, Cape Horn—from the Falkland Islands—the sea off Crozet's Island, Kerguelen's Land—and, though with some doubt, from the shores of New Zealand. They were collected chiefly by the officers attached to the Antarctic Expedition (*Mus. Brit.*).

Sp. 2. HERMADION MAGELHAENSE, *Kinberg*, *l. c.* and *Fregatt. Eugen. Resa*, p. 22, tab. 6. figs. 32, 32 A–32 H.

Hab. Straits of Magellan, *Kinberg*.

Sp. 3. ? HERMADION EXTENUATUM.

Polynoë extenuata, *Grube, Actin. Echin. und Würm. Adriat. und Mittelmeers*, p. 86.

Hab. Adriatic and Mediterranean Seas, *Grube*.

Sp. 4. ? HERMADION PELLUCIDUM.

Polynoë pellucida, *Ehlers, die Borstenwürm.* i. 105, t. 3. f. 5, 7–14, t. 4. f. 1–4.

Hab. Quarnero, Istria, *Ehlers*.

These two latter species are doubtfully referred to this generic group, *H. pellucidum* having only 10 pairs of elytra.

Sp. 5. ? HERMADION TROCHISCOPHORUM.

Polynoë trochiscophora, *Schmarda, Neue wirb. Th.* p. 151, tab. 36. f. 310, 310*a*, *b*.

Hab. Table Bay, Cape of Good Hope.

This species, apparently belonging to this genus, has only 12 elytra, instead of 15. Notwithstanding this discrepancy, the place for it seems to be here.

Sp. 6. HERMADION FEROX, sp. nov.

This very striking species is about 2 inches long, exclusive of the proboscis. The colour of the whole dorsal surface, except the bristles of the feet, is nearly black; and the ventral surface is of a dark pearly hue. It is slightly attenuated at the inferior extremity. It has a singular appearance, from the very strong, straight spines on the dorsal branch of the foot, which extend nearly an inch from the body, and give it a ferocious aspect.

The head is of moderate size; eyes large and round; tentacle very short, thick at the base, setaceous at the point. Antennæ a little longer, fixed by their bases under the tentacle, setaceous; palpi long, thick at the base, setaceous at the point. Proboscis large, black; jaws large and stout. Feet strong, biramous, the two branches of nearly equal size and wide apart. Bristles of dorsal branch very long, strong and sharp-pointed, smooth, and of a bright horn-colour. Bristles of ventral branch much shorter, and finely serrated from a little below the sharp smooth point down for about ⅓rd of their length. Both branches are produced into a long sharp point. Dorsal cirrus long, very slender and setaceous, only a little shorter than the long bristles of dorsal branch. Elytra thin, membranous, nearly smooth, but armed with a few scattered, rather strong prickles. Anal cirri long, slender, and setaceous like the dorsal cirri. Ventral cirri set upon strong peduncles, reaching to about the end of ventral branch of foot.

Hab. Dredged, during the Antarctic Expedition, from a depth of 300 fathoms, in lat. S. 74½°, long. E. 175½° (*Mus. Brit.*).

Sp. 6. HERMADION FULIGINEUM, sp. nov.

The animal is about 1½ inch in length, and, including the setæ of feet, about ½ an inch broad. It is nearly black, the dorsal surface especially so, while down the centre of the ventral surface there runs a lighter-coloured streak or line. The head is of moderate size; the antennæ are affixed by their bases to the cephalic lobe under the tentacle, and are short. The tentacle is long—about three times the length of the antennæ. The palpi are very stout at their bases, and very long, much longer than the tentacle. All these organs are smooth and setaceous. The feet are stout, biramous; and each branch is prolonged into a long, sharp, setaceous point, that of the ventral branch being the longest. The two spines are brown-coloured, and extend to the point of each prolongation. The bristles of the dorsal branch are slightly curved and densely serrated along the upper half of their length. Those of the ventral branch are longer, more numerous, more slender, straight, and toothed from the apex, on each side, for about a third of their length. The dorsal cirri are long, setaceous, and sparsely and irregularly armed with cilia. The ventral cirri are sharp and setaceous. The elytra are 15(?) pairs, oval in shape, and covered all over with minute granulations. The margin and the surface near the external margin are dotted with large, round, prominent tubercles; and one extremity is densely fringed with cilia.

All the specimens we possess are unfortunately in rather bad condition, so that it is difficult to determine the exact length of the animal and the number of the elytra. Most of the dorsal cirri, too, have fallen off.

Hab. Along with the preceding species, from a depth of 300 fathoms, in lat. 74½° S., long. 175½° E. (*Mus. Brit.*).

Genus VI. THORMORA, gen. nov.

Bases of antennæ produced from the anterior margin of the cephalic lobe; elytra 12 pairs, not covering the middle of the back, and leaving the posterior segments of the body naked; setæ of dorsal branch of feet of two kinds; body elongated.

Sp. THORMORA JUKESII, sp. nov.

Animal about 1½ inch long, rather more slender at the anterior extremity, elongated, and of a very dark colour. Antennæ and tentaculum nearly of the same length, incrassated a little below the apex, where they suddenly become produced to a fine slender point. Palpi longer than antennæ or tentacle, conical at the base, setaceous at the point. Buccal cirri of about the same length as the palpi, and, like the antennæ and tentacle, incrassated below the apex, and terminating suddenly in a sharp slender point. Elytra 12 pairs, but apparently small, and leaving the middle of the back and lower portion of the body uncovered. They are of a rounded form, tuberculated on the surface, and ciliated on the external margin. The feet are stout, biramous. Bristles of ventral branch stout, of a yellow colour, somewhat curved near the apex, and a little below the point strongly serrated and striated across. The fascicle of bristles springing from the dorsal branch is composed of two kinds,—one numerous, slender when compared with those of ventral branch, straight, acute at the point, and very finely serrated on both sides; the other, slender hairs, longer than the others, very numerous and quite smooth, appearing like a brush of fine hairs intermixed with the bristles. The dorsal cirri are, like the antennæ, incrassated below the apex, and ringed with black, and terminating suddenly in a fine slender point. Ventral cirri of feet setaceous, and reaching nearly to the apex of the ventral branch of the foot. Anal cirri stout, and of the same structure as the dorsal.

In the way in which the antennæ are attached to the cephalic lobe, and in the number of elytra, this species might appear to belong to the genus *Lepidonotus* as restricted by Kinberg; but the disposition of the elytra, their leaving the middle of the back and the posterior segments of the body uncovered, distinguish it from that genus, and would apparently refer it to the genus *Hermadion*. It differs from that genus, however, in the number of the elytra, whilst, on the other hand, the existence of two distinct kinds of bristles in the fascicle of the dorsal branch of the feet distinguishes it from all of the genera established by Kinberg. I have therefore been obliged to propose for its reception a new genus, which I have characterized as above.

For the specimen of this species in the collection we are indebted to Mr. Jukes, who collected it during the voyage of H.M. ship the 'Fly.' Unfortunately the habitat has not been preserved; but probably it is a native of the seas of Australia or New Zealand (*Mus. Brit.*).

Genus VII. NOREPEA, gen. nov.

Head three-lobed. Tentacle attached to the margin of the centre lobe; palpi attached to the side lobes; no antennæ. Elytra 14 pairs, covering the back entirely. Body short.

Sp. NOREPEA PERONEA.

Polynoë Peronea, *Schmarda, l. c.* 157, t. 36. f. 315*, 315**a*.

Hab. Coast of Ceylon, *Schmarda.*

This species approaches in general form and appearance to the *Polynoë* (*Iphione*) *muricata* of Savigny. It differs, however, from that species in the number of elytra, in having a tentacle, which is wanting in the genus *Iphione*, and in the absence of antennæ, which, again, are present in *Iphione*.

I only know the animal in question from Schmarda's figure and description.

Genus VIII. HERMENIA, *Grube, Annulata Oerstediana*, p. 18.

Tentacle long. Antennæ only half the length of the tentacle, but much exceeding the 1st elytron. No palpi. Elytra 12 pairs, exceedingly small, except 1st pair. Branches of feet connate. Body short.

In his description of this genus, Grube makes no mention of the situation of tentacle and antennæ, or appearance of cephalic lobe; and the species upon which the genus is founded I have never seen.

Sp. HERMENIA VERRUCULOSA, *Grube, l. c.*

Hab. St. Jan (Honduras ?), *Oersted.*

Genus IX. HEMILEPIDIA, *Schmarda, l. c.* 149.

Elytra 15 pairs, placed only on anterior portion of body, the posterior (larger portion) being left uncovered. Dorsal cirri in all the segments. Eyes 4; jaws 4, large.

Schmarda, who first characterized this genus, says that it is closely allied to the genus *Hermadion* of Kinberg, differing chiefly from it in the possession of large maxillæ.

Sp. 1. HEMILEPIDIA TUBERCULATA, *Schmarda, l. c.*
Hab. Table Bay, Cape of Good Hope, *Schmarda.*

Sp. 2. HEMILEPIDIA ERYTHROTÆNIA, *Schmarda, l. c.* 150.
Hab. Sea, near Cape of Good Hope, *Schmarda.*

Genus X. POLYNOË (as restricted by Oersted).

Polynoë *et* Lepidonotus (pars) *auctorum.*

Antennæ with their bases attached to the anterior portion of cephalic lobe, under the tentacle. Elytra 15 to 40 pairs, placed only on the anterior portion of the body, leaving the greater part of the posterior portion uncovered. Dorsal cirri alternating with the elytra. Branches of feet connate; bristles simple; body long and slender.

Sp. 1. POLYNOË SCOLOPENDRINA, *Savigny, Syst. Annél.* p. 25.

This fine species, at least 4 inches in length, is a native of the coasts of France as well as England.

Hab. Falmouth (*Mus. Brit.*).

Sp. 2. POLYNOË LONGISSIMA.

Eumolpe longissima, *Blainville, Dict. Sc. Nat.* lvii. 459, Atlas, pl. 10. f. 3.

M. Audouin and Milne-Edwards notice this species in their 'Hist. Nat. Littoral de la France,' quoting Blainville's specific name and figure, but regret that it had not been more fully described. I have not seen the species.

Hab. Coast of Genoa, *Blainville.*

Sp. 3. POLYNOË BLAINVILLII, *M.-Edwards, Littoral de la France,* p. 94; *Grube, Famil. der Annelid.* pp. 37 and 120.

Eumolpe scolopendrina, *Blainville, Dict. Sc. Nat.* lvii. 459, Atlas, pl. 10. f. 2.

Hab. Unknown.

Sp. 4. POLYNOË ELEGANS, *Grube, Actin. Echinod. Würm. des Adriat. und Mittelmeers,* p. 85.

Hab. Adriatic and Mediterranean Seas *Grube.*

Sp. 5. POLYNOË VARIEGATA, *Grube, Ann. Oersted.* 23.
Hab. Madeira, *Kröyer.*

Sp. 6. POLYNOË NIGROVITTATA, *Grube, l. c.* 24.
Hab. Rio Janeiro, *Kröyer.*

Sp. 7. POLYNOË ANTARCTICA, *Kinberg, Bearbeitung der Würmer K. Svenska Fregatten Eugenies Resa* (fide *Carus*).
Hab. Straits of Magellan, *Kinberg.*

Sp. 8. POLYNOË AUCKLANDICA, *Schmarda, l. c.* 158.
Hab. Auckland, New Zealand, *Schmarda.*

Sp. 9. ? POLYNOË LONGA.
Aphrodite longa, *Fabricius, Faun. Grœnland.* p. 313.
Hab. Coast of Greenland, *Fabricius.*
This species is said by Fabricius to possess 56 pairs (!) of elytra.

Sp. 10. ? POLYNOË MINUTA.
Aphrodite minuta, *Fabricius, l. c.* 314.
Hab. Coast of Greenland ?, *Fabricius.*

[*To be continued.*]

On the Surface-fauna of mid-Ocean.

By Captain SAMUEL R. J. OWEN, F.L.S.

[Read March 2, 1865.]

No. I.

POLYCYSTINA AND ALLIED RHIZOPODS.

SOME years since, when surface-dredging for Pteropods, &c., in the Bay of Bengal and other parts, living Polycystina, together with a few species of Foraminifera, were frequently found attached to the nets. This induced me to systematically dredge the surface of mid-ocean for these Rhizopods on the first opportunity that afterwards presented itself. The regions chosen for these researches were the Indian and Atlantic Oceans, where there were few or no islands near, the washings from whose shores might interfere with the results.

The surface-dredgings were commenced near the Sandheads in the Bay of Bengal, and in a longitude of about 90° east, until we arrived at 10° south of the line, thence making nearly a direct course for the Cape Land, passing Madagascar at a distance of 250 miles. They were resumed in the South Atlantic Ocean, near the Cape of Good Hope, and continued in nearly a straight course to latitude 33° north, and longitude 44° west, the equator being crossed in longitude 22° west. A register has been kept of the different species of animal life met with in each portion of these long tracts of ocean-surface, and rarely has the sea been found free from some species of Polycystina.

Many of these forms have been hitherto claimed by the geologist; but I have found them still enjoying life, according to their small powers, in this their true home, the siliceous shells filled with coloured sarcode, and sometimes this sarcode in a state of distention somewhat similar to that found projecting from the Foraminifera, but not in such slender threads.

I will now make a few observations on the appearance of these little gems of ocean. Having seen the Polycystina fresh from their native element in all their living splendour, I can assert that there are no objects in nature more brilliant in their colouring or more exquisitely delicate in their forms and structure. Unfortunately these tints can rarely be preserved. I have, however, coloured a few drawings to illustrate their appearance when fresh from the sea. Some are of but one colour—crimson, yellow, or blue; sometimes two of these colours will be found in the same individual, but always separate, and rarely if ever mixed to form green or purple. In a globular species, whose shell is made up of the most delicate fretwork, the brilliant colours of the contained blue and yellow sarcode shine through the little perforations very prettily. In two other specimens of the triangular and square forms, the respective tints of yellow and crimson are vivid and delicately shaded. In one the pink lines are concentric; while another is of a stellate form, the points and uncoloured parts being bright clear crystal, a beautiful crimson ring surrounding the centre portion.

I have dwelt upon the colours in order to give some idea of their natural appearance in the living state. The beautiful forms and delicately fine structure could be nearly as well seen in the fossil specimens.

The Polycystina appear to avoid the light, as they are rarely to be found on the surface of the sea in the daytime; it is after sunset, and during the first part of the night especially, that they make their appearance. I cannot say whether they make the bottom of the ocean their home during the day. The weight of their siliceous coverings would no doubt allow them to sink rapidly; and if they do so but to the distance of a few fathoms, it proves that they must have some means of extracting air from the water, to enable them to rise again to the surface. Whether the living Polycystina are to be found at the bottom of the ocean can only be determined by deep-sea dredgings.

It will naturally be asked if I can throw any light on the propagation of the race. It is a subject I touch upon with some diffidence; but I must not pass by this very interesting topic without giving what little information I have been able to gather by a long and diligent search. Rare have been my opportunities of witnessing anything that seemed to elucidate this matter; but still sufficient has presented itself to enable me to offer or rather perhaps to hazard an opinion; but my facts and specimens may, at all events, be of some value.

I would refer to the mode in which two Diatoms or two Desmidiaceæ will unite, and how the contents of one will pass into the cell of the other. With Diatoms, &c., this process has been easily watched; with the rarer Polycystina such opportunities have been more difficult to obtain. I have seen the conjunction of two individuals, the yellow sarcode appearing as two separate yelks, one in each shell. One of my specimens shows the line of junction very distinctly, and, I think, proves that such specimens must not be taken as single individuals of another species. Another represents a similar case, in which only one shell is filled with the sarcode, the other being quite empty. A drawing was taken by me while at sea from a specimen in the live-box: this proved to me that the sarcode had not contracted in drying and thus filled only a portion of its original space. In a dead and dried specimen this might have been contended for. As I have said before, the thing is rare to witness; and it will require the evidence of other careful observers to clear up this point entirely to ou satisfaction, for I hold it to be a matter of great interest.

In the cases I have observed, the siliceous shells appear to closely unite; they might be easily mistaken for one individual, if seen only in the fossil state, or after having been subjected to the action of nitric acid. It was the fact of the sarcode being found in only one portion that first gave me a clue to its real nature. I say *real*, provided always I am right in my conjecture.

The shells of some of the globular forms of the Polycystina, whose conjugation I believe that I have witnessed, are composed of a fine fretwork with one or more larger circular holes; and I suspect the junction to take place by the union of two such apertures. That the figures of these shells become somewhat distorted or elongated, and the passage of communication enlarged, I do not take to be a difficulty; for I believe that, while living, some of the forms are to a certain extent elastic. Some species lose their globular form after death, and present a distorted surface. When the aperture is enlarged, it is easy to conceive that the elastic shelly portion is both distended and absorbed.

Although I have searched most diligently for the young of the Polycystina, I have been unable to find even comparatively small specimens of each species. I have therefore been led to doubt their growth in their present form. May not the Polycystina be the more perfect condition of some other creatures that attain their full size, and at the point of change or chrysalis-state are resolved into sarcode, upon which the siliceous shell is afterwards formed? (some minute marine Entozoa for instance?) or may not their first form of life be simple sarcode, or an *Amœba*? Some of the extremely thin shells still elastic seem to favour this supposition. If periodically, on increasing in size, they change their shells like the Crustaceans, where are we to look for the very small ones?

One globular species appears like a specimen of the Chinese ball-cutting—one sphere within another; but it is a marked and distinct kind.

I have not been able to meet with any cases of multiplication by division, unless the few specimens of conjugation which I have before noticed should hereafter prove to be of this nature: in most of the forms anything of this kind would be at once detected. There is one that at first sight seems to favour this notion; but as it has likewise an internal shelly portion, I do not think it can be looked upon in this light.

A case of the breaking-up of the contained sarcode into granules, as in the diatoms, was observed, and a drawing taken from the living specimen in the live-box. I would call attention to two kinds of egg-like forms—some yellow, others of a bright deep blue. The colour of this species generally is uniform—either all blue, red, or yellow—but not granular. It is but little I can say on this most important point; but I hope what I have witnessed, and here brought to notice, though but a few steps in advance, will show the road to be taken for further investigation.

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Synopsis of the Diptera of the Eastern Archipelago discovered by Mr. WALLACE, and noticed in the 'Journal of the Linnean Society.' By F. WALKER, Esq., F.L.S.

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THE synopsis which follows these notes is arranged like Mr. Smith's tabular geographical view of the Hymenoptera of the Eastern Archipelago in the Seventh Volume of the 'Journal of the Linnean Society.' The synopsis only contains the species discovered by Mr. Wallace; and the districts may be mentioned in the following order:—

Malacca, with Mount Ophir, affords 51 species, and Singapore 67 species. Borneo comes next in succession, passing by Sumatra and Java, where the fauna is generally very distinct from that of the rest of the archipelago. Only 129 species are recorded from Borneo, and this extensive region is very inadequately represented. In Celebes the species collected amount to 236. Amboyna comes next; and several species of this island have been recorded by Dr. Doleschall, in addition to the 50 species collected by Mr. Wallace. Aru supplies 166 species; Batchian contributes 75 species; and New Guinea, the most eastern district, enumerates above 70. The other isles have been so little investigated that they may be passed over without notice.

About 300 species of Philippine Diptera have been lent to me by Professor Bellardi, and a very large proportion of them are undescribed.

The following families are not referred to in these notes; for their occurrence in the archipelago is as yet nearly or entirely unknown:—Mycetophilidæ, Cecidomyzidæ, Bibiomidæ, Simulidæ, Chironomidæ, Phlebotomidæ, Heteroclitæ, Rhyphidæ, Empidæ, Œstridæ.

The gnats or mosquitoes (or *Culicidæ*) are represented in these isles by 12 species of *Culex*, 2 of *Megarhina*, and 1 of *Anopheles*. The genus *Culex* is found throughout the world, and has probably continued from very early ages as compared with many other genera of insects. The species of different countries have much mutual resemblance, with the exception of a few that are peculiar to warm regions; and it is remarked by Humboldt that in some parts of South America each stream has its peculiar species. The genus *Megarhina* is especially South American, and does not appear in Africa, nor on the continent of Asia, nor in Australia.

Tipulidæ.—Of the seven genera in the following list, two (*Limnobia* and *Tipula*) are distributed throughout the world; and the *Limnobiæ* here recorded are very few, and it is probable that there are numerous undiscovered species in the eastern isles. *Limnobia* is a remarkable group, on account of the variation of the structure of the wing-veins being nearly equal to the number of species, which is very great. It will be divided into very numerous genera; and Baron Osten-Sacken has taken the lead in this part of systematic entomology with regard to the North American species. He has discovered in North America several species which in England are represented by *Geranomyia*; and he regards these as the remains of an earlier creation, which has mostly passed away in Europe, its former existence being indicated by fossils. *Geranomyia* is a native of the sea-coast, and is found, with *Orphnephila*, in the Channel Isles and in the western parts of Great Britain; and these two genera, like the little *Chironomus* that hovers over sea-weed, may have lived on the shores of the former Atlantic continent. The species of *Tipula* and of *Pachyrhina* here recorded are few in number, and are not peculiar in structure. *Megistocera* is an Australian genus, and is remarkable for the very great length of the antennæ of the male. The species in this list has been long known as a native of Java; and Mr. Wallace has discovered it in Aru. *Ctenophora* is generally distributed; but *Pterocosmus* is a new genus, founded on five species from Borneo; and *Gymnoplistia*, which was before only known in Australia, is represented by three species.

Stratiomidæ.—This family is very diversified in the isles, and is represented by 26 genera, of which 16 are new. The species of these new genera are of comparatively small size, and in them the characteristics of the family are not much developed. *Ptilocera* appears to be peculiar to these isles and to South Africa; and *P. quadridentata* is the only Dipterous insect that has been found in almost all the islands here mentioned. *Clitellaria*, *Cyclogaster*, *Stratiomys*, *Oxycera*, *Chrysomyia*, and *Sargus* are widely distributed. Of *Eudmeta* only one species is known; and it occurs in Hindostan, Singapore, Sumatra, and Java. *Phyllophora* was founded on a West African species, and Singapore is its only other locality. *Hermetia*, to which *Massicyta* may be united, is especially a South American genus, and has not been discovered in Africa, nor on the continent of Asia.

Xylophagidæ.—It is doubtful whether this family has been discovered on the archipelago; for perhaps *Rhypomorpha* may not belong to it. This is very different from all other genera, though it has some resemblance to the North American genus *Rachicerus*.

Tabanidæ.—One species of *Pangonia*, a genus that abounds in Australia, has been discovered in the archipelago. *Tabanus* is especially characteristic of continents, and the species appear to have been multiplied since the continents were established by the joining together of islands. About 600 species of this genus have been recorded. *Chrysops* and *Hæmatopota* are nearly as widespread as *Tabanus*; and *C. dispar* is among the few of these insular species that appear also on the continent of Asia.

Asilidæ.—The *Dasypogonites* are of rare occurrence; they are represented only by 13 species and by 4 genera (*Mydas*, *Discocephala*, *Dasypogon*, and *Dioctria*), all of which are found in several other regions. In the *Laphrites*, the numerous species of *Laphria* here recorded are the most remarkable features in the Dipterous fauna of these islands. By far the greater part of them are of the metallic-coloured group, which has very few representatives in other parts of the world. Most of the species are very closely allied to each other, and some of them will probably be considered mere varieties. Perhaps the connecting links will disappear by degrees, and the remainder will then be recognized as isolated or clearly defined species; or, in botanic phrase, the segregate species which compose the aggregate species will partially cease, and the true species will continue or will be more evident. It is well known that some regions of the earth represent now the earlier state of other regions; and in like manner the preparatory establishment of species may be observed in some districts, while there are no traces of such a process in other districts. Among the *Asilites*, the genera *Trupanea* and *Ommatius* are nearly limited to the warmer parts of the earth; and several species of them inhabit these isles. *Asilus* and *Leptogaster* are generally distributed, and the former contains a vast number of species: of the few here mentioned, all are new, excepting *A. longistylus* and *A. Barium*; and the geographical range of the latter extends to Ceylon. In Aru there is one species of the Asiatic genus *Damalis*.

The *Bombylidæ*, so various in form, are very scarce in these isles, and appear only in four genera—*Therma*, *Anthrax*, *Geron*, and *Systropus*; the last is a widely spread genus, but contains very few species. In this family the archipelago especially differs from Australia, and has no representatives of the peculiar forms and of the large number of species that inhabit the latter region.

The *Leptidæ* comprise a few species belonging to *Leptis*, *Chrysopila*, and *Suragina*, of which genera the last one is new, and contains two species from Gilolo.

In the Dolichopidæ there are many species belonging to *Psilopus*, *Dolichopus*, *Diaphorus*, and *Chrysotus*; and as all the species of this family are of small size, it is probable that they are much more numerous.

Lonchopteridæ.—It is doubtful whether the new genus *Cadrena* belongs to this family.

The *Platypezidæ* and the *Pipunculidæ* are each limited to one species. *Pipunculus* has been found in Amboyna; it also occurs in Australia.

Syrphidæ.—Some genera of this family are selected for notice. *Ceratophya* was discovered by Dr. Doleschall; it was before only known in North America. The species of *Ceria* are very few; yet five of them are contained in this list, and four of these are new. The species described as *C. lateralis* is *C. indica*. The genus *Eristalis* contains four of the few Dipterous species whose geographical range extends beyond the archipelago. *E. Amphicrates* inhabits Hindostan and China; *E. Andræmon* and *E. æneus* inhabit Hindostan; and *E. arvorum* inhabits China. *Baccha Amphithoë* and *Ascia brachystoma* are also natives of Hindostan; so also are *Syrphus ægrotus* and *S. alternans*; and *S. ericetorum* inhabits Africa.

Conopidæ.—One species of *Conops* was discovered by Dr. Doleschall; it has little affinity to the Australian representatives of the genus.

Muscidæ.—Several of the subfamilies of this most extensive group are very slightly represented in the list; but it is probable that a large number of new species will be discovered.

The *Tachinides* amount to less than 60 species. This number appears very small when it is considered that the European species of these parasitic Muscidæ are excessively numerous. They are in exact contrast to the *Muscides*—where the species are comparatively few, but occur in immense swarms; whereas in the *Tachinides* the species appear to be interminable, but none of them are in any abundance. In this the *Tachinides* resemble some tribes of parasitic Hymenoptera, and, like them, may have been diversified in character by the numerous kinds of insects on which they are parasitic. *Hamaxia* and *Zambesa* are the only two new genera. *Megistogaster Imbrasus* inhabits China as well as Borneo.

Dexides.—*Rutilia* may be mentioned as indicating in some of the isles an approach to the Australian fauna, this genus being restricted to the archipelago and to Australia. It is the largest in size, and the most brilliant in colour, of all the Muscidæ. Felder has named a genus of *Rhopalocera* after Dr. Doleschall; and as my genus *Doleschallia* is very closely allied to *Torocca*, I have united these two genera, and have annulled the former name.

Sarcophagides.—*Sarcophaga*, the type of this tribe, is very widely distributed, and the species have much mutual resemblance. *S. ruficornis* inhabits Hindostan and Malacca; and all the other species in this list are merely insular.

Muscides.—*Idia* is limited to the warmer regions of the Old World, and of the species here mentioned some have a wider range than the generality of these Diptera: thus, *Idia australis* is found in Australia, *I. xanthogaster* in Hindostan, and *I. testacea* in the Mauritius. Two of the species of *Musca* have been already described, and inhabit also Hindostan; the rest are new, and some of them are indicated as new subgenera. *Musca domestica* is omitted from the list.

Anthomyides.—These may be passed over without notice, as it is probable that only a very small part of them are yet discovered, and that they have been neglected on account of their small size and dull colour; and the same remark will apply to the *Helomyzides*, the *Borborides*, the *Lauxanides*, the *Ascinides*, the *Geomyzides*, the *Phytomyzides*, and the *Hydromyzides*. In the *Helomyzides*, the occurrence of *Cœlopa* may be mentioned as that of a genus which seems to be nearly peculiar to other regions. It swarms on the northern shores of Europe; but in the Channel Isles it is scarce, and another genus replaces it on the sea-weed.

The *Celyphides* are closely allied to the *Lauxanides*, and are very remarkable on account of the development of the scutellum, whereby these flies have the semblance of beetles. Their range extends from Hindostan through the archipelago to the Philippine Isles.

Ortalides.—This subfamily is remarkable on account of the great variety of its forms, the beauty of its colours, and the elegant markings on the wings of many species. Thirteen new genera have been established on the insular species—*Xangelina*, *Xiria*, *Poticara*, *Mystia*, *Callantra*, *Aragara*, *Sophira*, *Rioxa*, *Valonia*, *Brea*, *Adrama*, *Polyura*, and *Strumeta*. A few of the other genera require some notice. A species of *Oxycephala* inhabits Ceram; but elsewhere the genus is only known to occur in North America. *Lamprogaster* is abundant in Australia; and the species of it in Malacca, Singapore, and some of the isles exhibit a resemblance to the Australian fauna. A few of the insular species are very remarkable on account of the great breadth of the head; and they form the genus *Zygænula* of Doleschall, or *Pterogenia* of Bigot. The genus *Dacus* abounds in the isles; and several of the species, like the *Laphriæ*, are very closely allied to each other, and have much resemblance to the species of Hindostan and of Ceylon. The very extraordinary genus *Achias* attains its greatest development in Aru: some future investigation may lead to the discovery of the use of the long petioles on which its eyes are seated.

Diopsides.—The singularity of the eyes of *Diopsis* has been too often described to require any notice here. The genus extends from Africa to the Philippine Isles.

Sepsides.—The genus *Colobata* is very generally distributed, and is rather numerous in these isles; and the species, though natives of widely separated regions, have much mutual resemblance. Some of the species of *Sepsis* have a great likeness to the British species, which occur now and then in immense swarms. The genus *Angitula* was established on the female of *Elaphomyia*, Saunders (*Phytalmia*, Gerstäcker). The female was transmitted to England long before the horned male of this most peculiar genus was known. The typical *Elaphomyiæ* are not mentioned in the list, as I have not described them; but the one species here recorded differs widely from the others, and I have transferred to it the generic name *Phytalmia*.

Psilides.—The species are few in number, but contain four new genera—*Cœnurgia*, *Texara*, *Seraca*, and *Gobrya*.

The known species of the *Phoridæ*, like those of the preceding group, are almost wholly European, and only two have been found in the archipelago. The *Hippoboscidæ* require no notice.

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Sciara																												
laticollis					*																							
solita					*																							
selecta																					*							
longipes															*													
ponderosa																*												
varipes													*															
filipes													*															
Mycetophila																												
obscurata														*														
Leia																												
indivisa											*		*															
Cecidomyia																												
deferenda					*																							
Plecia																												
dorsalis				*	*	*											*				*		*					
subvarians					*																							
Megarhina																												
immisericors			*										*		*	*							*					
inornata													*															
Culex																												
splendens						*				*	*																	
annulipes						*																						
fuscanus		*		*	*																							
scutellaris																					*							
obturbans													*		*								*					
impatibilis															*													
impellens															*													
imprimens																	*											
ventralis													*				*											
zonatipes													*															
filipes													*															
Anopheles																												
vanus															*													
Chironomus																												
instabilis													*															
Limnobia																												
leucotelus						*																						
plecioides						*																						
dichroa				*																								
impressa					*																							
rubescens					*																							
pyrrhochroma					*																							
argento-cincta					*																							
imponens															*													
vittifrons																	*											
strigivena													*															
quadrifurca													*															
perdecora													*															
terminalis													*															
euchroma							*																					
latifascia													*															
auroatra																							*					
plenipennis													*															

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Limnobia																												
infixa													*															
contingens													*															
exclusa													*															
trisignata													*															
delectata																*												
innotabilis																*												
selectissima																							*					
filiformis													*															
Tipula																												
pedata					*					*																		
vilis					*																							
infindens															*	*												
inordinans															*													
fumifinis																	*											
congruens													*															
pallida													*															
Megistocera																												
fuscana										*											*							
Pachyrhina																												
tripartita													*															
tenuis													*															
colorata														*														
Ctenophora																												
chrysophila						*																						
incunctans															*													
gaudens															*													
Pterocosmus																												
lunigerus					*																							
infixus					*																							
optabilis					*																							
combinatus					*																							
dilutus					*																							
Gymnoplistia																												
jurgiosa																					*							
fulviceps													*															
melancholica																							*					
insolita														*														
Ptilocera																												
quadridentata			*	*	*	*	*	*	*	*		*	*	*		*	*				*							
smaragdina			*												*													
smaragdifera															*													
Clitellaria																												
bivittata						*	*		*	*			*								*							
responsalis													*															
flaviceps					*	*																						
varia				*	*					*																		
notabilis					*																							
festinans															*													
gavisa															*													
obesa			*									*	*			*												
tibialis															*	*												
Cyclogaster																												
radians						*																						

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Cyclogaster																												
detracta					*																							
infera					*																							
Aulana																												
confirmata																							*					
Phyllophora																												
angusta						*																						
Eudmeta																												
marginata		*				*			*	*																		
Ampsalis																												
geniata															*													
Massicyta																												
bicolor						*																						
inflata																					*							
cerioides							*					*									*							
Hermetia																												
remittens															*													
rufiventris																	*											
Culcua																												
simulans					*																							
Evaza																												
bipars					*																							
Nerua																												
scenopinoides											*	*				*					*							
impendens															*													
Solva																												
inamœna															*													
hybotoides							*																					
Adraga																												
univitta																					*		*					
Salduba																												
diphysoides																					*							
hilaris												*																
lugubris												*																
melanaria												*																
scapularis												*																
singularis												*																
gradiens																							*					
areolaris																							*					
Gabaza																												
argentea																					*							
Oxycera																												
manens															*													
Musama																												
paupera																							*					
Tracana																												
iterabilis															*													
Obrapa																												
perilampoides												*	*								*	*	*					
celyphoides												*	*								*							
Rosapha																												
habilis			*												*													
Ruba																												
inflata															*													

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Ruba																											
opponens												*															
Tinda																											
modifera														*													
recedens												*															
Saruga																											
conifera												*		*													
Chrysomyia																											
bipars											*																
Sargus																											
luridus				*	*																						
longipennis			*					*																			
metallinus	*				*					*												*							
latifascia				*																							
complens												*								*							
fortis												*															
rogans	*																		*							
repensans														*													
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mactans														*		*											
inactus														*													
quadrifasciatus											*					*						*					
longipes												*															
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tibialis						*					*																
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tarsalis						*					*																
debilis											*	*															
inficitus											*																
Stratiomys																											
lutatius			*																								
confertissima																				*							
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immiscens														*													
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atraria												*															
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parallela												*															
bifascia												*															
æqualis											*																
cinctilinea						*																					
Rhyphomorpha																											
bilinea											*																
Pangonia																											
caliginosa												*															
Tabanus																											
speculum														*													
partitus					*																						
univentris			*	*																							
hybridus				*																							
nexus				*																							
fumifer				*																							
optatus				*																							

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Tabanus																												
succurvus															*													
doreicus													*															
recusans																					*							
obscuratus																*												
serus																*												
factiosus															*													
reducens															*								*					
exagens																							*					
spoliatus															*													
facilis																							*					
immixtus															*													
extricans												*																
flexilis				*											*													
insurgens												*																
cohærens													*															
papouinus													*															
breviventris													*															
sylvioides																							*					
humillimus															*													
simplicissimus					*																							
Chrysops																												
dispar		*		*	*					*							*											
fasciatus					*					*					*													
fixissimus					*																							
signifer												*																
parallelus												*																
Hæmatopota																												
roralis					*																							
atomaria					*																							
Mydas																												
basifascia															*													
Discocephala																												
dorsalis				*	*																							
pandens															*													
concolor															*													
Dasypogon																												
vica		*			*																							
incomptus					*																							
inopinus																					*							
honestus												*									*							
glabratus												*																
congressus															*													
solutus							*																					
semifilatus							*																					
indecorus													*															
Dioctria																												
claviventris													*															
Laphria																												
paradisiaca																				*								
gloriosa																					*							
liturifera													*															
congrua												*				*							*					

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Laphria																												
consurgens												*																
socia								*								*	*				*							
Taphius			*												*	*	*											
tristis							*					*				*	*											
scapularis										*											*							
obliquistriga													*		*													
consobrina																					*							
comes							*					*					*				*							
complens											*				*													
replens													*															
placens																				*								
flagellata							*																					
consors												*									*		*					
divulsa																							*					
germana																					*		*					
setipes							*																					
requisita															*	*							*					
compta																	*											
sodalis																					*							
tibialis													*															
partita															*													
conveniens							*					*	*															
ostensa																*												
auribasis											*																	
argentifera												*																
Reinwardtii				*	*				*	*																		
ampla																	*											
vulcanus				*						*					*	*												
flagrantissima												*	*								*		*					
flammipennis															*													
ardescens												*	*															
concludens															*													
justa																					*							
disciplena													*															
tripars													*															
basifera												*																
manifesta											*	*									*							
declarata																					*							
aperta											*										*							
bipars													*															
puer											*		*				*						*					
dioctrioides															*													
pipunculoides													*															
amœna													*															
alternans					*	*				*																		
aurifacies				*	*	*															*							
basifera						*																						
inaurea					*	*																						
basigutta						*																						
fusifera						*																						
sobria						*																						
plana					*	*																						

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Laphria																												
imbellis						*																						
notabilis				*	*																							
orcus				*																								
elegans		*		*																								
radicalis				*																								
triangularis					*			*	*																			
constricta					*				*																			
unifascia					*																							
comptissima					*																							
rudis					*																							
producta					*																							
lepida					*																							
completa					*																							
incivilis					*																							
partita					*																							
interrupta					*																							
cingulifera					*																							
detecta					*																							
Trupanea																												
Amorges					*																							
inserens					*																							
Plutonica							*								*													
strenua															*													
contradicens																					*							
complens													*															
interponens												*																
addens												*																
transacta																							*					
Gilolana							*																					
calorifica															*													
concolor															*													
Asilus																												
lineosus					*	*																						
latifascia						*																						
fusiformis				*																								
debilis				*																								
Barium				*	*				*																		*	
flagrans					*																							
contortus					*																							
areolatus															*													
areolaris															*													
mendax															*													
strenuus													*															
depulsus																							*					
superveniens																				*								
biligatus											*																	
tenuicornis															*													
lævis													*															
didymoides																							*					
normalis								*																				
longistylus										*											*							
introducens															*	*												
determinatus															*													

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Asilus																												
involutus							*					*																
complens												*																
condecorus							*	*																				
Ommatius																												
Hecate					*	*																						
Pennus				*	*				*																			*
gracilis				*																								
inextricatus																*												
discalis															*													
scitulus															*													
Lucifer											*			*							*							
noctifer							*				*	*	*				*			*	*		*					
strictus															*													
retrahens			*				*	*								*					*		*					
nanus			*										*										*					
noctulus													*															
canus														*														
invehens											*																	
platymelas							*																					
bacchoides																*												
Damalis																												
lugens													*															
Leptogaster																												
tricolor					*																							
inutilis					*																							
ferruginea												*									*							
longipes																					*		*					
albimanus																					*							
munda															*													
tarsalis												*				*												
exacta								*					*															
magnicollis																*												
Thereva																												
præcedens					*																							
congrua											*				*						*							
conscita							*																					
Anthrax																												
Pelops			*				*				*	*	*	*	*	*	*				*		*					
Tantalus	*	*			*					*					*													
pennipes					*					*																		
devecta																	*											
confirmata												*																
prætendens											*	*	*	*	*	*	*				*		*					
distigma		*	*		*					*	*	*	*		*	*					*	*						
satellitia					*																							
emissa																*												
aterrima												*			*		*											
prædicans															*													
demonstrans															*													
emittens																	*											
degenera					*	*									*						*							
antecedens												*			*													
congrua															*													

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Anthrax																												
apicifera													*															
Geron																												
simplex																					*							
Systropus																												
sphecoides															*													
Hybos																												
bicolor													*								*							
deficiens																				*								
Epiceia																												
ferruginea												*	*			*	*						*					
stigma													*															
Leptis																												
decisa				*	*																							
ferruginosa			*		*							*	*		*	*	*				*	*	*					
impar												*																
Suragina																												
illucens															*													
signipennis							*																					
Chrysopila																												
maculipennis					*																							
vacillans																					*							
guttipennis												*																
stylata																							*					
Psilopus																												
robustus					*	*																						
tenebrosus					*	*																						
posticus				*																								
clarus				*																								
subnotatus				*																								
apicalis					*				*																			
allectans					*																							
alliciens					*																							
illiciens					*																							
delectans					*																							
proliciens					*																							
prolectans					*																							
colliciens					*																							
derelictus					*																							
lucigena													*	*							*		*					
æneus										*			*								*							
spectabilis															*													
variipennis												*	*															
extendens													*															
benedictus													*	*		*					*		*					
persuadens																	*											
seticornis																*												
terminifer																					*							
subrectus																							*					
æstimatus															*													
flavicornis									*			*	*								*							
perficiens																	*											
egens													*	*		*					*							
moderatus																							*					

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Psilopus																												
abruptus															*													
filifer															*													
superans																	*						*					
marginalis												*																
orcifer													*								*							
Dolichopus																												
electus					*																							
alligatus					*																							
collectus					*																							
trigonifer																					*							
cinereus															*													
prædicans															*													
provectus															*													
præmissus															*													
proveniens															*													
vicarius													*															
pulchriceps																							*					
Diaphorus																												
delegatus					*																							
resumens			*										*		*						*		*					
Chrysotus																												
exactus															*													
Cadrena																												
lonchopteroides															*													
Platypeza																												
glaucescens															*													
Pipunculus																												
Amboinensis																	*											
Ceratophya																												
indica														*			*											
Ceria																												
Javana				*	*					*					*													
annulifera													*															
smaragdina																					*							
relicta																					*							
relictura																					*							
Microdon																												
fulvicornis																					*							
apicalis																					*							
Graptomyza																												
tibialis															*						*							
Milesia																												
macularis					*	*				*																		
Reinwardtii					*	*				*																		
vespoides						*																						
Zamiel					*																							
conspicienda															*													
Eristalis																												
niger?					*	*				*																		
singularis						*																						
Amphicrates	*	*		*						*																		
arvorum	*				*					*																		
Andræmon		*			*																							

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Eristalis																												
splendens											*	*	*			*	*				*			*				
resolutus													*					*		*	*							
inscripta																	*						*					
obliterans																	*											
bomboides													*		*								*					
obscurata													*															
tortuosa															*													
lucilioides												*											*					
muscoides																					*							
erythropyga																							*					
postscripta																							*					
conductus													*								*							
æquipars																							*					
placens																							*					
Agno																	*								*			
Æsopus	*														*													
suavissimus																					*							
inficitus															*													
helophiloides												*																
merodontoides																*												
crassus		*												*														
Helophilus																												
insignis				*	*	*																						
quadrivittatus		*																			*							
mesoleucus																					*							
consors															*													
conclusus															*													
Xylota																												
conformis					*	*																						
ventralis																					*							
Eumerus																												
figurans															*													
argentipes												*																
Merodon																												
varicolor					*																							
interveniens															*													
Orthoneura																												
basalis																					*							
Paragus																												
substitutus												*																
latiusculus															*													
venosus													*															
luciferus													*															
incisuralis													*															
Baccha																												
Amphithoë		*			*																							
dispar															*													
basalis													*															
incisa												*																
tripartita												*											*					
purpuricola																				*			*					
Ascia																												
brachystoma		*			*																							

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Syritta																												
illucida															*													
Volucella																												
trifasciata					*					*																		
decorata															*													
Axona																												
volucelloides																							*					
Baryterocera																												
inclusa					*																							
gibbula															*													
Citibæna																												
aurata					*																							
Syrphus																												
ericetorum		*						*		*		*	*								*		*			*		
ægrotus	*	*	*		*					*	*	*	*			*					*		*					
consequens			*	*		*									*													
duplex						*																						
triligatus				*																								
alternans		*			*																							
divertens					*																							
cyathifer					*																							
Azpeytia																												
scutellaris													*															
Conops																												
rufifrons																	*											
metaxantha											*																	
Echinomyia																												
brevipennis				*																								
sarcophagoides															*													
Tachina																												
Ophirica				*																								
analis																	*											
discifera																	*											
Nemoræa																												
amplificans															*													
tenebrosa															*													
postulans													*															
Saralba																												
ocypteroides													*															
Hamaxia																												
incongrua																	*											
Masicera																												
vicaria						*																						
tomentosa				*																								
Morio							*										*											
horrens															*													
sarcophagata																*												
dotata															*													
immersa															*													
Mysolana																							*					
manifesta																	*											
notabilis																					*							
prominens																	*											
tentata																					*							

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Masicera																												
solennis																					*							
simplex																					*							
guttata																					*							
ficta												*																
prognosticans															*													
Eurygaster																												
muscoides						*																						
subferrifera					*																							
limitaris												*																
mutans													*															
remittens								*							*													
ridibunda							*						*		*													
tentans																					*							
fingens														*														
conglomerata															*													
prominens															*													
interdicta																							*					
apta															*													
deducens															*													
contracta															*													
progressa															*													
phasioides																					*							
decipiens																					*							
Trichoprosopa ?																												
divisa																							*					
marginalis																	*											
Megistogaster																												
Imbrasus	*				*																							
Metopia																												
inspectans															*													
instruens															*													
Phorocera																												
expellens																	*											
decedens																	*											
basitincta																	*											
convertens													*	*														
Zambesa																												
ocypteroides						*																						
Dexia																												
divergens				*																								
munda					*																							
extendens					*																							
fusiformis															*													
basifera															*													
nivifera												*																
includens															*													
parallela								*																				
præcedens															*													
alulifera												*				*						*						
cylindrica															*													
pectoralis																					*							
Rutilia																												
saturatissima							*					*																

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Rutilia																												
plumicornis													*								*							
fervens							*					*																
pectoralis													*															
glorificans													*															
Moneta											*		*															
lucigena											*		*															
atribasis								*				*																
complicita												*										*						
angustipennis																*					*							
sapphirina							*																					
excelsa								*																				
volucelloides												*																
trixoides							*					*																
ignobilis																			*									
Gymnostylia																												
invita													*															
luteicornis							*																					
Prosena																												
pectoralis											*		*								*							
argentata																					*		*					
lurida													*															
coacta																*												
secedens																*												
fasciata													*															
Torocca																												
abdominalis															*													
gonypedoides											*		*															
cylindrica													*															
consors											*																	
Cynomyia																												
fortis					*																							
Sorcophaga																												
ruficornis		*		*																								
reciproca				*	*	*																						
aliena				*	*										*													
indicata					*																							
sericeo-nitens			*													*	*											
aurata																	*											
compta																					*							
invaria															*						*							
mendax							*								*													
brevis													*			*												
innotata																							*					
basalis																				*								
perpusilla													*															
inextricata															*													
Idia																												
bicolor				*																								
tenebrosa				*																								
discolor					*					*																		
bivittata					*																							
australis															*						*				*			
xanthogaster		*								*										*								

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Idia																												
æqualis																					*							
divisa															*													
prolata			*												*													
testacea																				*								
Musca																												
defixa						*																						
infixa						*																						
fumipennis						*																						
dotata						*																						
diffidens					*	*																						
chrysoides				*																								
trita				*	*																							
reflectens				*																								
porphyrina				*																								
confixa				*																								
perfixa				*																								
affixa				*																								
chalybea					*																							
micans		*			*				*	*					*													
exempta					*																							
prospera															*													
costalis							*				*	*	*			*	*						*					
gloriosa																					*							
opulenta																					*							
conflagrans															*													
delectans															*													
diffusa												*																
decrescens																							*					
bivittata																	*											
sarcophagoides													*															
mesembrinoides													*															
ingens													*		*													
macularis																					*							
divitiosa																							*					
marginifera																					*							
nitescens															*													
ditissima			*										*		*													
flaviceps		*			*	*									*													
selecta															*													
sperata															*													
inscribens															*													
electa													*		*													
optata															*													
obtrusa							*					*			*	*	*			*	*							
benedicta																					*							
fortunata			*										*		*													
porphyricola																							*					
intrahens															*													
proferens															*													
refixa						*	*								*													
gavisa															*													
inconclusa																	*											
obscurata											*										*							

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Musca																												
patiens																					*							
umbrifera															*													
aricioides																							*					
sordidissima																							*					
præcox																*												
collecta															*													
xanthomela															*													
conducens															*													
favillacea			*												*													
eristaloides																					*							
calliphoroides													*	*									*					
prædicens															*													
promittens			*				*	*					*		*	*							*					
ferruginea																	*											
trifascia													*															
Bengalia																												
Dioclea					*																							
spissa																					*							
Aricia																												
patula					*	*				*																		
argentata				*																								
inaperta					*																							
albicornis													*										*					
leucoceras																							*					
biplaga																							*					
contraria													*		*								*					
significans															*		*				*		*					
nigricosta															*													
canivitta														*							*							
vicaria																				*								
squalens																				*								
integra															*													
prolixa																							*					
Hydrotæa																												
solennis				*																								
Spilogaster																												
xanthoceras															*													
Lispe																												
bimaculata															*													
Ophyra																												
riparia																	*											
reducta																	*											
Anthomyia																												
illocata					*																							
procellaria															*						*							
incertula													*															
Atomogaster																												
biseriata							*																					
triseriata							*																					
Cænosia																												
macularis		*			*																							
insurgens					*																							

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Cænosia																												
luteicornis															*						*							
signata															*													
respondens															*													
liturata																							*					
Cœlopa																												
inconspicua																					*							
Xarnuta																												
leucotelus						*					*	*	*	*	*						*							
Cordylura																												
bisignata															*													
Helomyza																												
intereuns				*																								
exeuns				*																								
orientalis					*					*																		
fuscicostata					*																							
æquata					*																							
limbata					*																							
provecta					*																							
invicta					*																							
niveistriga													*															
quadrifera													*															
meritoria																							*					
optatura													*															
tripunctifera															*													
copiosa															*													
fissifera																							*					
atripennis													*								*		*					
picipes													*								*							
scutellaris												*	*															
restituta													*								*							
observans															*								*					
interventa							*																					
ortalioides													*															
stelliplena													*															
Sciomyza																												
replena															*													
leucomelana							*								*								*					
Amblada																												
atomaria															*													
Cotamba																												
fumifera											*	*	*										*					
Tondera																												
testacea													*															
Dryomyza																												
semicyanea							*				*	*	*	*							*							
Sepedon																												
costalis												*									*							
Javanensis										*					*													
invicta					*																							
frontalis												*																
Sapromyza																												
biguttata					*					*																		

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Gauzania																												
devecta					*																							
Celyphus																												
obtectus		*	*	*											*													
scutatus		*	*		*										*													
Lauxania																												
eucera					*	*																						
detereuns				*																								
duplicans																					*							
minuens																					*							
perplexa																	*											
Lonchæa																												
inops																*					*		*					
punctipennis			*												*													
consentanea							*								*													
atratula															*													
Thressa																												
signifera															*													
Ochthiphila																												
discoglauca															*													
Xangelina																												
basigutta				*																								
Oxycephala																												
alienata																*												
Xiria																												
antica				*																								
Poticara																												
triarcuata													*															
tricurvata											*																	
biarcuata														*														
Mystia																												
attrahens													*															
Platystoma																												
rigida						*																						
stellata				*	*																							
frontalis															*													
potens							*	*																				
tarsalis																*												
ventralis																				*								
protensa											*																	
producta												*																
atomaria												*			*													
basalis															*													
fusifacies																					*							
multivitta																					*							
pectoralis							*																					
punctiplena															*													
brevis													*															
inscripta													*															
devocata													*															
diminutiva													*															
impingens														*														
Lamprogaster																												
zonata					*	*																						

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Lamprogaster																												
glabra					*	*																						
transversa				*																								
vittata				*		*																						
guttata						*																						
truncatula						*																						
basilutea					*																							
divisa					*																							
punctata					*																							
guttulosa					*																							
marginifera												*	*		*	*	*				*		*					
sexvittata															*													
luteipennis															*													
costalis													*															
superna							*																					
quadrilinea																					*							
delectans																					*							
scutellaris																					*		*					
bispinosa													*															
ochromyoides													*															
celyphoides																					*							
patula													*															
ventralis													*															
sepsoides																							*					
tetyroides																					*							
Zygænula																												
singularis															*													
paradoxa																	*				*							
variipennis												*																
vittifinis												*																
Callantra																												
smieroides															*													
Aragara																												
crassipes															*													
Enicoptera																												
pictipennis															*													
tortuosa															*													
plagifera															*													
arcuosa															*													
rufiventris																	*											
Dacus																												
æneus					*					*																		
determinatus					*																							
figuratus					*																							
divergens															*													
pubiseta												*											*					
addens															*													
devius											*		*															
strigifer							*																					
mutilloides																					*							
furcifer							*																					
expertus							*																					
sepedonoides											*																	
curvifer											*																	

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Dacus																												
perplexus							*																					
emittens															*													
maculosus												*	*															
areolatus												*																
strigifinis												*																
diffusus															*													
absolutus																*												
nigrilinea													*															
expandens																					*							
pectoralis											*	*									*							
bilineatus															*													
discipennis												*																
sordidus													*															
imitans															*	*												
exigens															*													
inaptus															*													
longivitta																	*				*							
lativentris																					*							
obtrudens																					*							
latifascia																					*							
contrahens															*													
speculifer													*															
lituratus											*		*	*									*					
biarcuatus													*															
concisus													*															
lateralis													*															
sepsoides												*					*											
varialis													*															
terminifer															*													
turgidus														*														
pompiloides																					*							
detrudens														*														
fulvitarsis															*													
inscriptus																	*											
signatipes													*				*											
instabilis													*															
Soita																												
psiloides															*													
Sophira																												
venusta						*																						
concinna					*																							
bistriga															*													
distorta															*													
punctifera							*																					
bipars																*												
Rioxa																												
lanceolata					*	*																						
confinis					*																							
bimaculata																	*											
formosipennis													*															
Palloptera																												
detracta																*												

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Valonia																												
complicata				*																								
Brea																												
discalis													*	*							*							
contraria																					*							
Adrama																												
selecta											*	*									*							
consors												*																
Diopsis																												
quadriguttata				*	*																							
quinqueguttata				*	*																							
discrepans					*																							
subnotata			*												*													
detrahens															*													
Noeeta																												
latiuscula					*																							
Urophora																												
fasciata					*																							
Trypeta																												
rudis					*																							
multistriga											*										*							
retorta							*																					
transiens																	*											
dorsigutta																					*							
approximans															*													
basalis																					*							
amplipennis			*												*													
lativentris															*													
stellipennis															*													
impleta																					*							
subocellifera																					*							
roripennis																				*								
basifascia															*													
nigrifascia															*													
signifacies																	*											
melaleuca																*												
diversata													*															
brevivitta													*															
Ortalis																												
prompta																					*							
obliqua												*																
tarsalis												*																
æquifera							*																					
concisivitta							*																					
complens																					*							
punctifascia							*																					
leucomera																							*					
vacillans															*													
decatomoides															*													
contigua													*															
semivitta													*															
Strumeta																												
conformis						*																						
repleta												*										*						

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Strumeta																												
concisa											*																	
helomyzoides																							*					
Polyara																												
insolita																					*		*					
Achias																												
maculipennis			*		*	*				*																		
longividens																					*							
latividens											*										*							
amplividens																					*							
aspiciens											*																	
brachyophthalma													*															
venustula													*															
dacoides														*														
Sepsis																												
basifera			*														*				*							
testacea			*												*													
frontalis															*													
fascipes															*													
revocans			*												*													
Angitula																												
longicollis							*				*	*		*		*					*		*					
Phytalmia																												
guttipennis															*													
Calobata																												
confinis				*		*																						
immixta				*																								
strenua					*																							
cedens					*																							
stabilis												*																
diffundens							*																*					
immiscens																							*					
gutticollis							*																					
impingens							*								*		*											
resoluta															*													
sepsoides																					*							
contraria													*															
albitarsis										*				*							*				*			
contingens																							*					
indica		*																			*							
Abana																					*							
bifasciata															*													
coarctata			*									*																
plagiata													*															
tipuloides													*															
Micropeza																												
fragilis			*	*	*	*						*	*		*		*						*					
forficuloides													*															
prolixa											*	*										*						
perclusa											*																	
Cardiacephala																												
longicollis					*																							
debilis																					*		*					
varipes															*													

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Lissa																												
cylindrica													*								*							
Nerius																												
fuscipennis			*	*	*	*				*					*													
duplicatus							*				*	*	*				*				*							
tibialis																	*											
mantoides													*															
Cœnurgia																												
remipes															*													
Texara																												
compressa					*	*																						
dioctrioides															*													
Stymbara																												
vagaria													*															
Seraca																												
signifera															*													
signata															*													
abbreviata													*															
Gobrya																												
bacchoides															*													
Psila																												
bipunctifera															*													
munda															*													
calobatoides													*															
cruciata													*															
basalis													*															
vittifera													*															
Piophila																												
contecta															*													
disjuncta													*															
Opomyza																												
nigrifinis															*													
Milichia																												
minuta													*															
Gymnopa																												
gutticosta					*																							
infusa					*																							
Oscinis																												
lineiplena																					*							
noctilux																					*							
femorata															*													
Chlorops																												
conclusata													*															
Cephaloconus																												
tenebrosus												*																
Drosophila																												
finigutta																					*							
melanospila																					*							
imparata																					*							
solennis															*													
rudis															*													
illata															*													
lurida															*													
lateralis															*													

	China.	India.	Philippines.	Malacca.	Borneo.	Singapore.	Gilolo.	Ternate.	Sumatra.	Java.	Waigiou.	Bachian.	New Guinea.	Salwatty.	Celebes.	Ceram.	Amboyna.	Sula.	Gorrite.	Key.	Aru.	Kaisaa.	Mysol.	Solomon's Isles.	Australia.	Africa.	Ceylon.	Corea.
Drosophila																												
pinguis															*													
dorsalis															*													
Ephydra																												
taciturna																					*							
borboroides															*													
maculicornis															*													
Discomyza																												
obscurata			*												*													
tenebrosa													*															
Nomba																												
tecta															*													
Ochthera																												
innotata															*	*												
Notiphila																												
lineosa															*													
quadrifascia															*													
flavilinea															*													
ortalioides														*									*					
unicolor																							*					
unilineata													*															
carbonaria													*															
Phora																												
bifasciata															*													
Pallura																												
invaria																					*							
Ornithomyia																												
parva																					*							
Doreica													*															
exilis													*															
plana													*															
Batchianica			*				*					*				*							*					
simplex															*													
obscurata															*													
Nycteribia																												
parilis												*																
dubia			*												*													

Contributions to a Monograph of the *Aphroditacea*.

By William Baird, M.D., F.L.S.

(Continued from vol. viii. p. 202.)

[Read Nov. 16, 1865.]

Family IV. ACOETIDÆ.

(Acoëtea, *Kinberg*, *Öfversigt. Kongl. Vetenskaps-Akademiens Förhandlingar*, 1855, p. 386.)

Body elongate; no facial tubercle; tentacle short, arising from the middle of the anterior portion of cephalic lobe; bases of antennæ concealed under the peduncles of the eyes; eyes 2, peduncled; pharynx exsertile, papillose on anterior margin; jaws large, horny, armed with two central and many lateral teeth; palpi long, strong, and smooth. Elytra 39–93 pairs, placed upon the 2nd, 4th, 5th, 7th, and all alternate odd segments onwards to the extremity of the body; segments not bearing elytra provided with dorsal cirri.

Genus I. Acoetes.

Acoëtes, *Audouin & Edwards, Hist. Nat. du Littoral de la France*, ii. p. 92.

Elytra flat, covering the whole back, and arranged imbricately from behind forwards, or in the reverse way to that of the *Aphroditidæ* and *Polynoïdæ*, the posterior portion of each elytron being covered by the anterior of the one behind it; peduncles of eyes about the same length as the peduncle of tentacle.

Sp. 1. Acoetes Pleei, *Audouin & Edwards, l. c.* p. 101, pl. 2a. figs. 7–14.

Polyodontes Pleei, *Grube, Archiv für Naturg.* 1855, p. 90.

Hab. Martinique, West Indies, *M. Plee.*

Sp. 2. Acoetes lupina, *Stimpson, Proceed. Boston Soc.* v. p. 116.

Hab. South Carolina, *Stimpson.*

Genus II. Eupompe, *Kinberg, l. c.* p. 386.

Cephalic lobe tripartite on anterior margin; peduncles of eyes a little shorter than peduncle of tentacle, and occupying the anterior portion of cephalic lobe; elytra 93 pairs, flat, thin, and inversely imbricated, or from behind forwards, leaving the anterior and middle portion of the back naked, but covering the posterior part.

Sp. 1. Eupompe Grubei, *Kinberg, l. c.* p. 387, and in *Fregatten Eugenies Resa*, p. 24, tab. 7. figs. 35a–35h, tab. 10. fig. 59.

Hab. Near Guayaquil, *Kinberg.*

Genus III. PANTHALIS, *Kinberg, l. c.* p. 386.

Cephalic lobe tripartite on anterior margin; central teeth of jaws contiguous; peduncles of eyes of the same length as that of tentacle, and occupying the anterior portion of cephalic lobe. Elytra 39 pairs; the anterior flat, covering the back, inversely imbricated; the remainder campanulate, imbricated posteriorly, and leaving the middle of the back uncovered.

Sp. 1. PANTHALIS OERSTEDI, *Kinberg, l. c.* p. 387, and in *Fregatten Eugenies Resa*, p. 25, tab. 6. figs. 34, 34A–34H, tab. 10. fig. 60.
Hab. West coast of Sweden, *Kinberg.*

Sp. 2. PANTHALIS GRACILIS, *Kinberg, Fregatten Eugenies Resa*, p. 26, tab. 10. fig. 61.
Hab. Near Rio Janeiro, *Kinberg.*

Genus IV. POLYODONTES.

(*Renieri*) *Blainville*, art. *Vers, Dict. Sc. Nat.* tom. lvii. p. 461.

Elytra very small, not covering the back, alternating with dorsal cirri; jaws large and horny; no antennæ; no tentacle; palpi long; eyes 2, peduncled.

Sp. 1. POLYODONTES MAXILLOSUS.
Phyllodoce maxillosa, *Ranzani, Mem. Stor. Nat. Bologna*, 1820, p. 1, tab. 1. figs. 2–9.
Hab. Adriatic Sea, *Ranzani.*

Sp. 2. POLYODONTES GULO, *Rüppell; Grube, Archiv für Naturg.* 1855, p. 90.
Hab. Red Sea, *Rüppell.*

Family V. SIGALIONIDÆ.

(Sigalionina, *Kinberg, l. c.* p. 387.)

Body long, narrow; no facial tubercle; cephalic lobe rounded. Feet, in anterior segments, provided with either an elytron or a dorsal cirrus; in posterior segments, feet provided with both elytra and dorsal cirri.

Genus I. SIGALION.

Sigalion, *Audouin & Edwards, Hist. Nat. du Litt. de la France*, ii. p. 3 (not *Kinberg*).
Sthenelais, *Kinberg, l. c.* p. 387.

Cephalic lobe rounded, having on its mesial portion, which is indented, a strong tentacle, at the base of which are affixed the antennæ; eyes 2 or 4 (?), sometimes so indistinct as not to be easily seen. Setæ of feet of three kinds—setaceous and serrulate, subulate and serrulate, jointed and bidentate. Elytra covering the back, furnished with simple papillæ.

Kinberg, in taking the *Sigalion Mathildæ* of Audouin and Edwards as the type of his restricted genus *Sigalion*, was, unwittingly perhaps, led into an error, from that species having been originally described by these authors from an imperfect specimen, in which the tentacle was destroyed.

In the illustrations to the 'Règne Animal,' édition Crochard, M. Edwards rectifies this mistake, having, since the first publication of the species, met with other and more perfect specimens: in these the tentacle was present.

It is only right and fair, as Ehlers had already pointed out, to restore the name *Sigalion* to the typical species as correctly described and figured by M. Edwards in the 'Règne Animal.' I therefore propose to retain the name *Sigalion* for the species which Kinberg has placed in his genus *Sthenelais*, and to institute a new genus to receive such as he referred to his restricted genus *Sigalion*.

Sp. 1. SIGALION MATHILDÆ, *Audouin & Edwards, Hist. Nat. du Littoral de la France*, ii. p. 105, tab. 2. figs. 1–10; *Règne Animal*, éd. *Crochard*, tab. 20. figs. 1, 1*a*–1*c*.

Hab. Coast of France, *Edwards*.

Sp. 2. SIGALION BOA, *Johnston*, *Loudon's Mag. Nat. Hist.* vi. p. 322, fig. 42 (1833).

Sigalion Idunæ, *Rathke, Act. Nov. Acad. Nat. Cur.* xx. pt. 1. p. 150, tab. 9. figs. 1–8 (1843).

Hab. Coast of Britain, *Johnston*; Coast of Norway, *Rathke* (*Mus. Brit.*).

Sp. 3. SIGALION HELENÆ.

Sthenelais Helenæ, *Kinberg, l. c.* p. 387, and in *Fregatten Eugenies Resa*, p. 27, tab. 8. figs. 36, 36A–36H.

Hab. Valparaiso, *Kinberg*.

Sp. 4. SIGALION ARTICULATUM.

Sthenelais articulata, *Kinberg, l. c.* p. 387, and in *Fregatten Eugenies Resa*, p. 28, tab. 8. figs. 38, 38A–38H, tab. 10. fig. 62.

Hab. Rio de Janeiro, *Kinberg*.

Sp. 5. SIGALION BLANCHARDI.

Sthenelais Blanchardi, *Kinberg, Fregatten Eugenies Resa*, p. 28, tab. 8. figs. 37A–37H.

Hab. Valparaiso, *Kinberg.*

Sp. 6. SIGALION OCULATUM, *Peters, Monatsbericht Akad. Wissenschaft. Berlin*, 1854, p. 610; *Arch. für Naturg.* 1855, p. 38.

Sthenelais oculata, *Kinberg, Fregatten Eugenies Resa*, p. 29, tab. 8. figs. 39, 39B–39H.

Hab. Mossambique, *Peters.*

Sp. 7. SIGALION LÆVE.

Sthenelais lævis, *Kinberg, Fregatten Eugenies Resa*, p. 29, tab. 8. figs. 40, 40B–40G.

Hab. Island of Eimeo, Pacific, *Kinberg.*

Sp. 8. SIGALION LIMICOLA, *Ehlers, Borstenwürmer*, i. p. 120, tab. 4. figs. 4–7, tab. 5. figs. 1–10.

Hab. Quarnero, Adriatic, *Ehlers.*

Sp. 9. SIGALION ARCTUM?

Aphrodita arcta, *Dalyell, Powers of Creat.* ii. p. 170, tab. 24. fig. 14.

Hab. Coast of Scotland, *Dalyell.*

Sp. 10. ? SIGALION PERGAMENTACEUM, *Grube, Annulata Oerstediana*, p. 24.

Hab. Santa Cruz, West Indies, *Oersted.*

Grube refers this species, with doubt, to the genus *Sigalion.*

Sp. 11. SIGALION BLAINVILLII, *Costa, Ann. Sc. Nat.* 2nd series, xvi. p. 269, tab. 11. figs. 1, 1*a*–1*d*.

Hab. Gulf of Naples, *Costa.*

Genus II. THALENESSA.

Sigalion, *Kinberg*, non *Aud. & Edwards.*

Cephalic lobe broad anteriorly; no tentacle; antennæ two, very short, placed on the anterior margin of the cephalic lobe; eyes 2, distant; compound setæ bidentate; simple setæ serrate; elytra covering the back, with ramose fimbriæ on the margin.

Sp. 1. THALENESSA EDWARDSI.

Sigalion Edwardsi, *Kinberg, l. c.* p. 387, and in *Fregatt. Eugen. Resa*, p. 30, tab. 9. figs. 41, 41 A–41 H, t. 10. f. 63.

Hab. Sea off the mouth of the River Plate, South America, *Kinberg.*

Genus III. LEANIRA, *Kinberg, l. c.* p. 388.

Cephalic lobe rounded, receiving the tentacle in a mesial groove; no antennæ; palpi very long; eyes 2, placed near the tentacle; superior setæ closely serrulate; inferior setæ slender, compound, pectinato-canaliculate at the apex; anterior elytra not altogether covering the back; no papillæ.

Sp. 1. LEANIRA QUATREFAGESI, *Kinberg, l. c.* p. 388, and in *Fregatt. Eugen. Resa*, p. 30, tab. 9. figs. 42, 42 A–42 H, tab. 10. fig. 64.

Hab. Sea off the mouth of the River Plate, South America, *Kinberg*.

Sp. 2. LEANIRA STELLIFERA.

Nereis stellifera, *Müller, Zool. Dan.* tab. 62. figs. 1–3.

Sigalion stelliferum, *Sars, Förhand. Vidensk. Selsk. Christiania*, 1861, p. 51.

Sigalion tetragonum, *Oersted, Fortegnelse*, p. 7, tab. 2.

Hab. Coasts of Norway and Sweden, *Müller, Sars, and Oersted.*

Genus IV. PSAMMOLYCE, *Kinberg, l. c.* p. 388.

Cephalic lobe anteriorly produced, and forming the thick base of a long tentacle; antennæ none; eyes 4? (2?); superior setæ simple, very slender, serrate; inferior setæ strong, bidentate; elytra not covering the middle of the back, with long fimbriæ on their margin.

Sp. 1. PSAMMOLYCE HERMINIÆ.

Sigalion Herminiæ, *Aud. & Edw. Littoral de la France*, ii. p. 107. tab. 1 A. figs. 1–6.

Hab. Rochelle, *M. d'Orbigny*.

Sp. 2. PSAMMOLYCE PETERSI, *Kinberg, l. c.* p. 388, and in *Fregatt. Eugen. Resa*, p. 31, tab. 9. figs. 43, 43 A–43 H.

Hab. Mossambique, *G. v. Düben*.

Sp. 3. PSAMMOLYCE FLAVA, *Kinberg, l. c.* p. 388, and in *Fregatt. Eugen. Resa*, p. 31, tab. 9. figs. 44, 44 A–44 H.

Hab. Rio Janeiro, *Kinberg*.

Genus V. CONCONIA, *Schmarda, Neue wirbell. Thiere*, ii. p. 150.

Segments of body numerous; elytra on 2nd, 4th, 5th, 7th, and all alternate segments up to the 27th, and then on every succeeding segment to the end of the body; dorsal cirri on all the segments. Feet biramous; setæ of upper branch denticulate;

those of inferior branch of two kinds: 1st, simple and strobiliform; 2nd, compound and bidentate. Jaws 4.

Sp. 1. CONCONIA CÆRULEA, *Schmarda, l. c.* tab. 37. fig. 319.
Hab. Coast of Chili, *Schmarda.*

Family VI. PHOLOIDIDÆ.

(Pholoidea, *Kinberg, Fregatt. Eugen. Resa,* p. 1.)

Elytra on all the alternate segments; no dorsal cirri, either on the segments possessing elytra, or on those in which elytra are wanting.

Genus I. PHOLOË, *Johnston, Ann. Nat. Hist.* ii. 428.

Body linear, oblong; proboscis with four horny jaws, the orifice plain; eyes 2; branches of feet connate; bristles of superior branch capillary, those of inferior branch falcate.

Sp. 1. PHOLOË INORNATA, *Johnston, Ann. Nat. Hist.* ii. p. 437, tab. 23. figs. 1–5.
Hab. Cumbrae, Firth of Clyde, *D. Robertson*; Berwick Bay, *Johnston* (*Mus. Brit.*).

Sp. 2. PHOLOË EXIMIA, *Dyster, MS.* in *Johnston's Catalogue of Non-parasitic Worms in British Museum Collection,* p. 122.
Hab. Tenby, *Dyster.*

Sp. 3. PHOLOË BALTICA, *Oersted, Conspect. Annul. Dan.* fascic. i. p. 14, tab. 1. fig. 21, tab. 2. figs. 34–36, 40.
Hab. Coast of Denmark, *Oersted.*

Sp. 4. ? PHOLOË MINUTA, *Oersted, Grœnl. Ann. Dorsib.* p. 17, tab. 1. figs. 3, 4, 8, 9, 16.
Aphrodita minuta, *Fabricius, Faun. Grœnland.* p. 314.
Hab. Godthaab, coast of Greenland, *Oersted.*

Sp. 5. PHOLOË TECTA, *Stimpson, Invertebrata of Grand Manan,* p. 36.
Hab. Grand Manan, in 4 forms, *Stimpson.*

Genus II. GASTROLEPIDIA, *Schmarda, Neue wirbell. Th.* ii. p. 158.

Elytra and dorsal cirri on alternate segments; elytra on 2nd, 4th, 5th, 7th, and all alternate segments up to the 53rd; ventral surface covered on all the segments with elytriform lamellæ; feet biramous.

Sp. 1. GASTROLEPIDIA CLAVIGERA, *Schmarda, l. c.* p. 159, tab. 37. fig. 315.
Hab. Ceylon, *Schmarda.*

Family VII. PALMYRIDÆ.

(Palmyracea, *Kinberg, Fregatt. Eugen. Resa,* p. 1.)

No elytra; fans of flat bristles on all the segments; segments having cirri and tubercles alternately along the back.

Genus I. PALMYRA, *Savigny, Système des Annélides,* p. 16.

Body oblong, depressed; proboscis without tentacles on edge; jaws semicartilaginous; eyes 2; feet with branches separate.

Sp. 1. PALMYRA AURIFERA, *Savigny, l. c.* p. 17.
Hab. Isle of France, *Cuvier*; Red Sea, *Savigny.*

Sp. 2. PALMYRA ELONGATA, *Grube, Annulat. Oersted.* p. 25.
Hab. Santa Cruz, West Indies, *Oersted.*

Sp. 3. PALMYRA DEBILIS, *Grube, Archiv für Naturg.* 1855, p. 90.
Hab. Villa Franca, Mediterranean, *Grube.*

Since this paper on the Aphroditacea was commenced (see vol. viii. of this Journal, p. 172) I have, through the kindness of M. Malmgren, now of Helsingfors, been made acquainted with an excellent paper of his on the Annelides of the North Sea, "Nordiska Hafs-Annulater," published in the 'Öfversight af K. Vet. Akad. Förhandlingar' for 1865. I regret not having seen this paper before these "Contributions to a Monograph of the Aphroditacea" were first commenced in this Journal. In his paper M. Malmgren has instituted no fewer than ten new genera belonging to the family Polynoidæ. Of these I can only here mention the names, with a reference to the species enumerated in my "Contributions."

I. NYCHIA. To this genus he refers nos. 2 & 3 of the genus *Harmothoë,* pp. 194, 195, *H. assimilis* and *H. scabra.* These two species he regards as only one, and as being synonymous with the *Aphrodita cirrosa* of Pallas.

II. EUNOË. To this genus he refers the *Lepidonota scabra* of Oersted, which, upon very good grounds, he considers distinct from the *Aphrodita scabra* of Fabricius.

III. LAGISCA. To this genus he refers no. 11 of the genus *Harmothoë,* p. 195, the *Polynoë rarispina* of Sars.

IV. EVARNE. To this genus he refers no. 3 of the genus *Antinoë*, p. 192, the *Polynoë impar* of Johnson.

V. LANILLA. To this genus he refers no. 1 of the genus *Antinoë*, p. 192, the *Polynoë lævis* of MM. Audouin & Edwards.

VI. MELÆNIS, and VII. EUCRANTIA. Of these two genera no species had been described previously.

VIII. ALENTIA. To this genus Malmgren refers no 9 of the genus *Halosydna*, p. 187, the *Polynoë gelatinosa* of Sars.

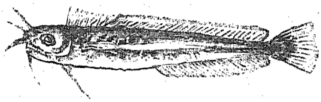
IX. ENIPO, and X. NEMIDIA. These genera approach the restricted genus *Polynoë*; but no species had previously been described.

Some Account of a newly discovered British Fish of the Family *Gadidæ* and the genus *Couchia*. By JONATHAN COUCH, F.L.S., &c.

[Read Nov. 16, 1865.]

THE genus *Couchia* was formed by Mr. W. Thompson, and has been adopted by Dr. Günther, as separated from that of *Motella* or the Rocklings by the more moderately lengthened body of the species, which is also compressed, and by the silvery and brilliant appearance of the sides. In fact, in their general proportions the fishes of this genus are as different from the Rocklings as, among their kindred the other *Gadidæ*, the Pollack and Whiting are from the Ling; while their manners also, so far as they are known, are as different as their shape. And yet, in some of the more prominent particulars of their organization, there exists a similarity between the *Motellæ* and *Couchiæ*, which is the more remarkable as it consists of a relative gradation in the species of each, which is only to be traced throughout by the discovery of one, of which a notice is now presented to the Linnean Society.

As there is a species of *Motella* which is characterized by the presence of four prominent barbs placed in pairs on the front of the head, with a barb dependent also from the lower jaw, so we find in the best-known, and probably most widely spread, of the genus *Couchia*, the Mackerel Midge (*C. glauca*), a similar conformation, together with a characteristic ciliated membrane situated in a chink in advance of the dorsal fin; which membrane certainly is not itself a fin, but an organ of sensibility which is in its most lively motion when the proper fins are at rest. But long before the discovery of this fish as a separate species, an account had been given by Colonel Montagu of a kindred fish, which he supposed to be common to the coast of Devonshire, and which he described as being distinguished by the possession of a pair only of these frontal barbs; and yet for more than half a century this species of Montagu had remained in obscurity, until it was again brought to light by the diligent and acute observation of Mr. Thomas Edward of Banff, who found it in some abundance in the Moray Firth, and kindly supplied the writer with examples, which enabled him to give an account of it, with a figure, in the concluding portion of the fourth volume of his 'History of the Fishes of the British Islands.' The five-bearded species had been already represented in a coloured figure in the third volume of the same book, as also in Mr. Yarrell's well-known volumes. But a vacancy still existed in the analogy between the species of the nearly allied genera *Motella* and *Couchia*; and it is this, again, we are able to supply through the persevering diligence of Mr. Edward, whose intelligence enabled him to detect the existence of another species, and whose kindness has, with an example, communicated materials which enable the writer to produce, with a satisfactory likeness, a somewhat extended notice of its actions, the latter of which will be described, as far as can be, in this attentive observer's own words. The length of the example from which my notes were taken is an inch and five-eighths; and as half a dozen others were about the same size, it may be judged to be their usual magnitude, as it does not differ much also from that of *C. glauca* and *C. Montagui*. Compared with the latter, its shape is more slender, the pectoral fin rather more lengthened and pointed, the ventral fins longer and slender, the cilia on the back, along the edge of the membrane, more extended, apparently more numerous, and very fine; barb on the lower jaw long; but what especially marks this little fish as distinct from the other species is, that, besides the pair of barbs in front of the head, there is a single one of much larger size in front of the upper lip, and which points directly forward with a slight inclination downward, thus analogically answering to the middle barb that projects from the snout of the four-bearded Rockling (*Motella cimbria*). It is probable that there are teeth in the jaws; but they can scarcely be seen; and there is a row of pores along each border of the superior maxillary bone. Some further particulars of this fish I prefer to give in the words of its discoverer, who describes its colour as a beautiful deep green along the back when caught, the sides brilliantly white; but when it reached me, preserved in spirit, it was blue, with a tinge of the same along the lateral line. In some examples in Mr. Edward's possession the colour on the back was a faint yellow, with a narrow stripe of bluish purple on the side, and in all of them the silvery hue of the lower portions of the body is found to rise nearer the back than in the other species of this genus. The back also and head were thickly covered with very small, dark, star-like spots, which, together with two narrow yellow streaks extending from the top of the head, above the mouth, and diverging to the eyes, had disappeared when subjected to my examination. Iris of the eye silvery, the pupil bluish green; the fins dull grey, as also the pair of barbs; but the single one on the lip at its root is almost of as deep a colour as the top of the head and back.



Five examples of these little fishes were kept alive by Mr. Edward for a week; and during that time he describes their action as being lively and singular, although perhaps not generally so active as the Mackerel Midge (*C. glauca*), and in general they appeared to prefer to remain near the bottom rather than to swim aloft. When at liberty their habit is to keep in small companies; but they seem to treat other fishes as enemies, and even their own companions are occasionally subject to their hostility, as is shown in the following instances related by Mr. Edward. He placed a Goby, he does not say of what species, in the same vessel with these fishes; but in the space of twenty minutes his attention was drawn to a commotion among them, which arose from the persecution inflicted on the unfortunate stranger, which they were violently assailing with their heads, while it endeavoured to escape from their fury. After a considerable time, however, this eager violence proved a misfortune to one of the Midges; for, missing its mark as it rushed forward, its head was dashed against the side of its glass prison with such force as to cause it to sink motionless to the bottom, and, although at times it appeared to struggle against its fate, in about an hour it was dead; as was the Goby in a few minutes after. Nor did this pugnacious disposition cease when the apparent cause of it had ceased to live; for, although they seemed peaceably disposed when first placed in the vessel, they now began to attack each other vigorously, as also their dead companion at the bottom; and if this fury subsided for a time, it was repeatedly renewed without apparent cause, and with an activity which caused them sometimes to leap out of the water, and even over the side of the vessel, to a considerable distance. Mr. Edward surmises that in the open sea this propensity to leap above the surface is rarely exercised; but it renders it difficult to keep them alive within a narrow space, and in the present instance it became necessary to place a (glass) cover on the vessel in which they were confined—an arrangement which speedily caused the death of two of the remaining combatants, in consequence of the injury they received from leaping against it in the violence of their contention. Mr. Edward remarks that he never witnessed the lifting up of the longer filament in front of the ciliated membrane on the back, but only of such as were behind it. The latter, however, were kept in constant vibratile action when the proper fins were at rest (as is the case also with this membrane in the Rocklings), while on the slightest disturbance their motion ceased and they sank within the protection of the channel prepared to receive them. The single barb in front of the upper lip appears to be endued with some special function, since, unlike the others, it is capable of visible, and perhaps voluntary, extension and retraction.

I regard it as no other than an act of justice to the discoverer of this fish to assign to it the name of Edward's Midge (*Couchia Edwardii*), of which the specific character is sufficiently obvious.

Some Observations on British *Salpæ*. By W. C. McIntosh, M.D., F.L.S.

[Plate I.]

[Read Nov. 16, 1865.]

The comparative rarity of these swimming Molluscoids within the ordinary experience of British zoologists induced me to pay some attention to them when lately engaged with another department of the science in the Hebrides. Indeed during the month of August they were the grand feature of the Western Ocean; so that the late Professor E. Forbes, in his three voyages through Scottish seas, during which he states that he saw not a single specimen *, must have passed these islands at the wrong season, or kept too far from shore. Dr. McCulloch, the discoverer of the species described in the 'British Mollusca,' mentions that he found them from the middle to the latter end of August, and always linked together. They occurred lately from the beginning to the end of August; and probably the time of their appearance stretches into the end of July and the beginning of September*. They appear to have a wide distribution on the shores of the Western Islands and the regions bordering on the Minch, northwards and southwards.

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* And Gosse observes, in his 'Manual of Marine Zoology,' vol. ii., "They are chiefly tropical and oceanic animals, swimmers in the wide and open sea, visiting our coast so rarely that we can scarcely reckon them as properly British animals."

At the beginning of August *Salpa runcinata* was the only species met with on the eastern shores of North Uist. The wind was westerly, and the weather good. In the creeks of Lochmaddy the hand-net could scarcely be put in without bringing some individuals of the solitary or aggregate forms to land (figs. 1 to 4). At this time few chains or portions of chains were met with along the beach-line, though the sea was calm. The separation of the aggregate forms must therefore have been due to changes in the individuals themselves or to previous rough weather. These individuals kept a foot or more under the surface of the water, and swam with vigour, showing none of the signs of impaired vitality that might warrant the statement that they soon perish after separation†.

In the loch itself on a quiet evening this species swarmed, moving in longer or shorter chains a few feet from the surface. Some of the chains had only a very slight bend; others were curved at one end like a crook; while a third series almost formed a U. There was no coiling or uncoiling of the chains, so far as I saw; but they moved slowly and steadily along, each appearing like a milky, semitranslucent, gelatinous riband marked with a series of dots. The most common hue of the visceral speck is brownish orange, though in some of the smaller individuals it is slightly yellow. Many solitary animals were also caught, and in confinement they proved somewhat hardier than the individuals of the aggregate form. Dr. McCulloch observes of this species, "that, like the Medusæ and analogous tribes, it cannot bear to be confined in a limited portion of water, as it died, even in the ship's bucket, in less than half an hour—a very remarkable circumstance in the economy of these imperfect animals." No difficulty, however, was encountered in this case in keeping Salpæ of all the forms alive for several days, provided the vessel was clean, wide at the top, and the sea-water frequently renovated.

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* Dr. Fleming got *S. runcinata* in spring on the coast of Caithness.

† *Vide* Rymer Jones's 'Animal Kingdom,' *Salpæ*.

No large Medusæ occurred in the bay at this date, the only other oceanic swimmers being hosts of a little Sarsia and a Thaumantias, that were caught in the creeks.

The Salpæ seem to be very sensitive in regard to the weather, as indeed the fragility of their chains might indicate. None appeared for about a week of rough or rainy weather, even though the surface of the sea might be as smooth as glass but for the pattering of the rain-drops. On a somewhat rough day the dredge near the mouth of the loch brought up in its progress hosts of the little Thaumantias previously mentioned, but not a single Salpa; so that they must have entirely evacuated the bay. Towards the eighth day a few isolated individuals were met with, not in the best condition; those amongst the rocks were mostly withered ones floated off the blades of Fuci between tide-marks. About a fortnight afterwards many of the same species (*S. runcinata*) were got near the mouth of the bay; but, curiously enough, all were brought in by the dredge, not a single specimen being captured by the towing-net, although the sea was moderately calm. Two other forms, however, were abundant on the surface, viz. *Salpa spinosa* of Otto (figured and described by Sars*, and mentioned by Forbes and Hanley in their work) and its progeny in chains (figs. 5 to 9). None but battered specimens of *S. runcinata* appeared at this time near the shore.

The enormous numbers of the two forms of *S. spinosa* that were driven into the creeks next day by the easterly breeze were surprising, and showed the extraordinary fecundity of the genus. The hand could not be held amongst the mild sea-water that laved the littoral Fuci without coming into contact with chains of the one form and individuals of both, that every wave of the sea poured in to be destroyed. After the breeze moderated, the Fuci between tide-marks sparkled in all directions with the quivering bodies of the unfortunate Salpæ, that, besides, here and there lay in heaps where the ebbing tide had stranded them behind stones. The hand net was filled by a solid mass when plunged into the water, and only a few specimens of *S. runcinata* were found amongst them.

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* 'Fauna littoralis Norvegiæ,' part i. p. 79, tab. 10. This work did not come into my hands before the present paper had left them. The differences in the figures and descriptions will explain themselves; they are chiefly confined to the former.

So plentiful were the beached Salpæ that the Fuci were rendered doubly slippery, and the tangled masses of *F. serratus* hung down from the rocks their every crevice spangled with the glittering mollusks. The small fishes (Coalfishes, Fifteen-spined Sticklebacks, Gobies, and young Wrasses) were in unusual numbers at the sea-border, hunting about in shoals, and doubtless feasting luxuriantly on the autumnal repast so plentifully cast in their way. Nor were other marine animals behind in this respect: one Caryophyllia that hung from a stone at the verge of low water attracted notice by having its disk unusually expanded and translucent, hard to the touch, and not contracting by the latter stimulus or exposure to the air; the cause of all this was found to be the presence of at least eight of the unfortunate Salpæ in its stomach, some of them still free from serious injury. Salpæ do not occur in such profusion at all seasons, and the change of diet is doubtless agreeable to the marine inhabitants of these shores.

The climax of Salpa life, however, was reached on the 22nd of August, when the sea was unusually calm and the weather very fine. The shores of the creeks and bays were so heaped with the bodies of the two forms of *S. spinosa* that the Fuci and rocks appeared as if coated with masses of boiled sago; the water of the creeks resembled starch from the myriad swarms; and the Laminarian blades at low-water mark lay on a semisolid medium. There were vast multitudes, certainly, on and near the beach; but a sail in the bay demonstrated a still more wonderful extent of Salpa prolificness. It may be safely said that there was not a single square foot of Lochmaddy that did not contain Salpæ, and in some parts the sea resembled boiled sago for long distances. On the surface floated the two smaller forms of *S. spinosa*, the aggregate, as usual, predominating over the solitary ones; while from a few feet under the latter, as far down as the eye could reach, chains of all lengths and sizes of *S. runcinata* swam with the current in the quiet manner previously described. These milky bands crossed and recrossed each other to such an extent that the very character of the sea, I may say, was altered; and it seemed as if flocculent strings of some milky precipitate hung therein, or as if gigantic fibres of asbestos had been scattered in profusion and at random throughout the entire bay. The scene was equally novel and interesting. With every stroke of the oars the purple and two-horned forms (*S. spinosa*) rose from the water and rolled like glassy crystals from the blades, and chains of the former now and then clung till a reimmersion washed them off.

The very progress of the boat appeared to be impeded; and on looking along the still expanse of the sea, their quivering bodies roughened its surface like a myriad tremors on molten glass.

Towards the mouth of the bay, drifted masses of Fuci formed long transverse lines across the surface, and at these parts not only were the Salpa-masses increased in density, but a number of other swimming jellies of a different subkingdom accompanied them, such as *Pelagia cyanella*, *Æquorea*, *Oceania*, *Beroë*, and *Diphyes*, the cavities of the two former containing many Salpæ. Some small fishes also skimmed the surface, apparently feeding on the latter; and with the hand net young Sand-launces, Brills, and numerous Mackerel Midges (*Motella* (*Couchia*) *glauca*) were captured. In such circumstances there was no need of a towing-net; and indeed it was practically useless, becoming filled in a few seconds with a solid mass of the surface forms. Numerous gulls and guillemots that had been at work at these seaweed lines amongst the Salpa-hordes, or seizing the small fishes so engaged, took wing on the approach of the boat. The Salpæ extended outwards into the Minch in almost as great numbers. The sea was so calm that the Dunvegan packet had to be towed by its own boat from Skye to Lochmaddy—not a very common occurrence in these wild waters.

At this time not a scrap of a Salpa or a Medusa was found at the western side of the island; so that the Salpæ must have passed through the Sound of Harris with the westerly winds in the beginning of August, or else were originally resident in the Minch, and had been driven westwards by the easterly gales.

The chains of *Salpa runcinata* in sight varied from two and a half yards downwards; and the deeper ones may have been longer. Those near the surface were generally less than a yard long. As before mentioned, there was neither coiling nor uncoiling, nor the "regular serpentine movements" described in the various text-books; but the bands moved slowly through the water, seldom altering their curves to any appreciable extent. They varied in bulk according to the size of the component individuals. The mode in which they were attached to each other in these chains was not so easily made out as at first sight might appear; they separated into pieces when lifted from the water either with hand or net; and there is thus good excuse for the rude outline of Dr. McCulloch—an outline, however, that will at once be recognized by any one who has seen them in their native haunts. The figure by the late Professor E. Forbes*, showing two in apposition, is stiff and artificial—a state in which it would never have been represented if he had seen living specimens.

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* Brit. Mollusca, vol. i. pl. E. fig. 6.

The individuals adhere to each other by a considerable extent of their edges, including the attenuated extremities, and form a sort of interrupted double row by being alternately attached. Thus, for instance, the second is attached to the first on its *right side*, the point of its attenuated process reaching beyond the visceral speck. The third adheres to the *left side* of the second, its point also proceeding beyond the nucleus. The long axis of each is nearly parallel to that of the entire chain. Dr. McCulloch states that "each individual adheres to the preceding by a regular sequence of superposition lengthwise, so that the whole form a long simple chain." He must have viewed the riband laterally.

Sometimes two individuals of large size (each 3 inches long) swam together—the fragment of a chain; and numerous single ones of the aggregate as well as of the solitary form occurred. The proper sphere of this species seemed to be from a point some feet below the surface, downwards, since any met with at the surface were mutilated, dying, or dead. One individual of the aggregate form was caught, just beyond the rocks, with a young specimen (true embryo of Professor Huxley) in its interior (fig. 1). The embryo, *a*, adheres to the nucleus, *b*, of the parent by the posterior extremity, and thus its anterior orifice agrees with that of the adult—a situation affording every facility for the passage of constantly renewed currents of water through its cavity. The adult specimen in this case exhibits a very common anastomosis of the muscular bands. In life these bands are scarcely seen, except as slight wrinkles during contraction; it is the immersion into strong spirit that renders them so visible.

The youngest condition of the solitary form observed is probably represented by that in the interior of fig. 1; the next, in the free form shown in fig. 4, where the preponderance of the visceral over the locomotive apparatus is very apparent. This is exactly the reverse of what takes place in the Ascidians, whose young forms acquire the maximum locomotive, the adult the maximum visceral. Each has its various requirements amply supplied in the structures developed at the time. The rounded opake body *a*, fig. 4, would seem to be embryonic, since it diminishes progressively as the size of the animal increases, and in the adult disappears. In fig. 2 a developing chain is observed at *f*. A peculiar network of vessels occurs over a limited space in two of the solitary forms figured (*b*, figs. 2 and 3).

The solitary form of *S. spinosa* is very transparent, and during life its six circular muscular bundles are also only seen as faint lines during contraction. In addition to the characteristic posterior spines, there is a stout bifid spinous process (*g*, figs 5 & 6) and a small lateral spine on each side of the coiled chain. A small red ocellus is seen at *a*, fig. 5, and four opake dots at *b*. The branchiæ, endostyle, nucleus, and coiled chain with various grades of developing young are represented in the figures. After preservation in spirit the inner tunic is seen to end, in each of the long posterior spines, in a trumpet-shaped process. This appearance is also observed in figs. 7 and 8, which represent a front and lateral view of a small and very active individual captured with the towing-net. It is probably a developing specimen of this form, judging from the number of muscular bundles and the trumpet-shaped ending of the tunic in the posterior processes. The latter, however, are flattened, oar-shaped, and short. It also possessed the bifid spinous process, at *b*, fig. 7. The nucleus was of a dull white hue in life; and the embryonic body, *a*, was still present. In one case the adult solitary form of this species was dead, as likewise were the included young; but the individuals (measuring $\frac{1}{10}$th of an inch long) of the pigmy chain depending from the parent contracted vigorously. Each was furnished with a little red ocellus.

The individuals of the aggregate form of *S. spinosa* were of all sizes, from $\frac{3}{4}$ of an inch in diameter downwards. Their figure was somewhat pyriform and facetted (fig. 9). The nucleus is tinted of a fine bluish purple with a streak of yellow, and the branchial apparatus has also the former hue. At the anterior end of the nucleus a constant ciliary motion was seen under the lens, not connected with the efferent current issuing at the posterior aperture. When adhering together in chains, they swim with the bluish-purple nucleus downwards; and the same remarks apply to their mode of locomotion as to the ribands of *S. runcinata*. The chains of the former were in general much shorter than those of the latter, though broader in proportion, since they were composed of a double row with the individuals arranged alternately; that is, the transverse fissures of the one row were opposite the centres of the other.

When swimming in a vessel during the day, the contractions of *Salpa spinosa* and its aberrant form caused a lens-like condensation of the rays of light, which flashed on the glass beneath them on each occasion. *S. runcinata* was not observed to be luminous in the twilight in the sea, neither were the two forms of *S. spinosa*; but when the latter were enclosed in a bottle, bright-greenish phosphorescent sparks were emitted on jarring the vessel in the dark; this, however, may have been due to the presence of other minute oceanic forms. There was no luminous appearance when the vessel was left quiescent in the dark; and none of the forms of either species were observed to give out the bright-greenish phosphorescence that invariably gilded the luminous Medusæ and Annelids for a few seconds after immersion in spirit.

A curious appearance was caused on the beach, during the plenitude of Salpa life, by the occurrence of two days of fine weather. The dried bodies of the beached Salpæ left whitish, glistening, scale-like patches on the black gneiss-stones and bare rocks near high-water mark; and when the chains of *S. spinosa* happened to subside without separation, an appearance was produced like the frond of *Asplenium viride* or *Trichomanes*, or the fossil imprint of some primeval fern.

DESCRIPTION OF PLATE I.

[Figs. 1, 2, 3, 6, 7 and 8 are from carefully made spirit preparations.]

Fig. 1. *Salpa runcinata*, with young solitary form (true embryo of Huxley) in its interior. Enlarged. *a*, the embryo; *b*, the nucleus of the adult; *c*, the branchiæ; *d*, the endostyle.

Fig. 2. An adult solitary form of the same species, about the natural size. *a*, nucleus; *b*, peculiar network of vessels; *c*, branchiæ; *f*, developing chain of young; *h*, endostyle.

Fig. 3. A lateral view of another, smaller solitary form, showing the embryonic body at *a*, and the network of vessels at *b*. Enlarged.

Fig. 4. A very young solitary form of *S. runcinata*. *a*, large embryonic body; *b*, nucleus; *c*, intestine. The muscular bands, branchiæ, and endostyle are apparent.

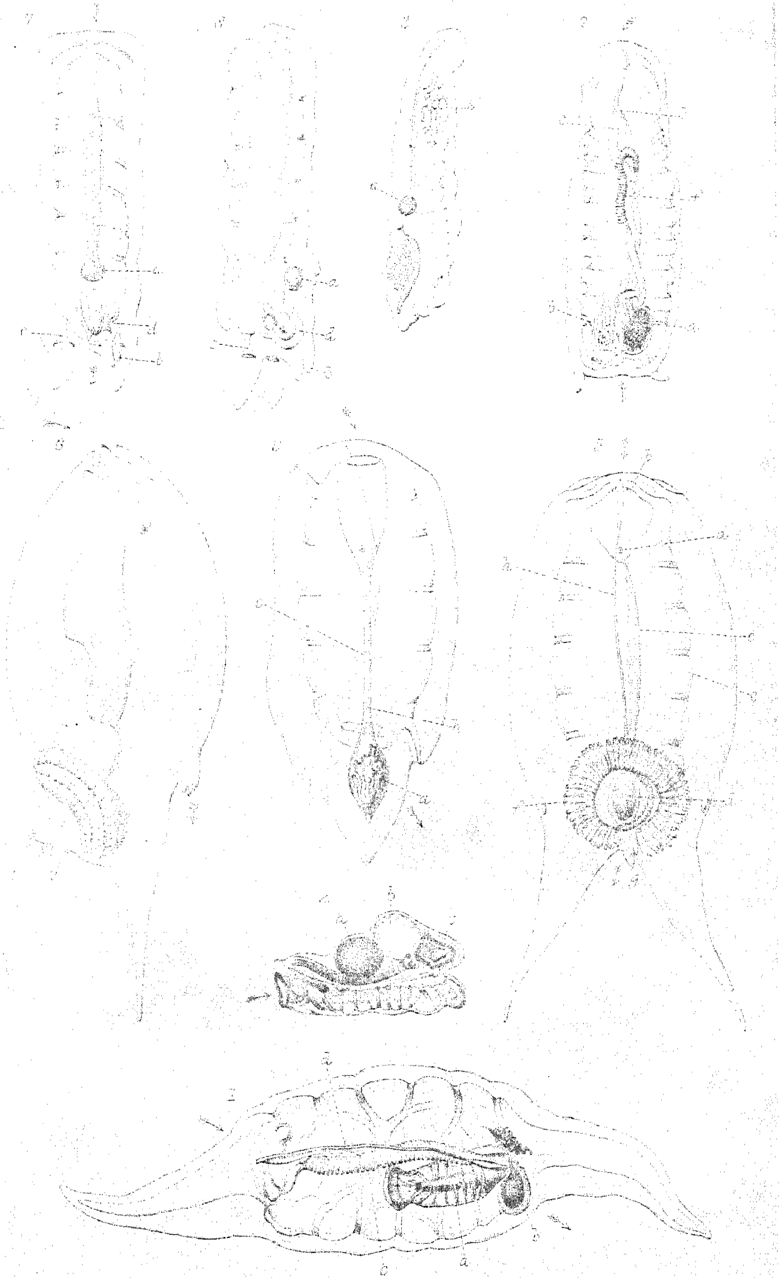
Fig. 5. *Salpa spinosa*, enlarged, from a living specimen. *a*, ocellus; *b*, four minute opake dots; *c*, branchiæ; *d*, nucleus; *e*, inner tunic with its muscular bands; *f*, coiled chain of young; *g*, bifid spinous process; *h*, endostyle.

Fig. 6. A lateral view of one of the same species, enlarged.

Fig. 7. Young solitary form of *Salpa spinosa* (?), enlarged. *a*, embryonic body; *b*, bifid spinous process; *c*, trumpet-shaped ending of inner tunic (mantle) in the posterior spine; *d*, nucleus.

Fig. 8. A lateral view of the same specimen. The letters are similarly placed.

Fig. 9. The aggregate form of *S. spinosa*, enlarged, from a somewhat contracted living specimen. *a*, bluish-purple nucleus; *c*, branchiæ; *h*, endostyle.

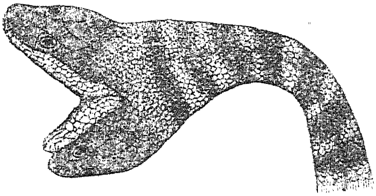


Robt. & W. C. M. del.   Tuffen West sc.   W. West imp.

Notice of a Double-headed Water-Snake. By JOHN SHORTT, M.D., F.L.S., M.R.C.P.L., &c., General Superintendent of Vaccination, Madras.

[Read March 15, 1866.]

THE accompanying woodcut represents a specimen of a water-snake caught alive in the backwater on the Eastern Coast.



I had frequently heard the natives give accounts of many-headed snakes, but, from my knowledge of the country and the reptiles of the district, I regarded them as fabulous tales, till I was presented with the specimen from which the drawing was made.

The reptile belongs to the suborder *Colubrinæ*, family *Hydrophidæ*, and is most probably a young *Hydrophis sublævis* of Gray. It measures 12½ inches in length, and 7 lines below the union of the double neck, and 1⅝ inch at the thickest part of its body, in circumference. The heads are distinct, and forked at the union, which in the integuments seems to occur at the base of the skull, whilst the separate necks unite about an inch lower down. The eyes, nostrils, mouth, and teeth in each head are perfect, and the two mouths lead into, or terminate in, one œsophagus, below the union, passing on apparently to the abdomen.

Crown shielded; occipital shields large; nostrils surrounded by a continuous ring; pupils round; body covered with small scales; ventral shields small; body fusiform; tail compressed and sword-shaped. Head dark brown, approaching black; concolorous interrupted stripes ⅛ inch wide along the back; sides and belly yellowish white; tail ringed, black, and the extremity, to the extent of an inch, of the same dark colour around its circumference. The specimen was taken alive, and apparently in excellent health, by a native fisherman; and, from its perfection as regards its heads, it would have been interesting to know whether it fed with both its mouths. Should I be so fortunate as to succeed in procuring a second specimen, I shall be glad to report the same to the Society. I hope to send the original to the museum of the Royal College of Surgeons, London, where it may be seen by any of the Fellows curious on the subject[*].

A List of the Diurnal Lepidoptera recently collected by Mr. WHITELY in Hakodadi (North Japan). By ARTHUR G. BUTLER, F.Z.S., Assistant, Zoological Department, British Museum. Communicated by WILLIAM CARRUTHERS, Esq., F.L.S.

[Read April 19, 1866.]

PAPILIO, *Linnæus*.

1. PAPILIO BIANOR, *Cramer*, sp., var. Japonica[†].

Papilio Bianor, *Cramer, Pap. Exot.* t. 103. f. c. (1776); *Fabricius, Ent. Syst.* iii. i. p. 1. n. 2.

Achillides Bianor, *Hübner, Verz. bek. Schmett.* 85 (1816).

♀ Papilio Paris, *Godart, Enc. M.* ix. 67. n. 116 (1819).

North India, China.

2. PAPILIO MACHAON, *Linnæus*, sp., var. (Eastern form).

Papilio Machaon, *Linnæus, Syst. Nat.* ii. 950, n. 33 (1767); *Hübner, Europ. Schmett. Pap.* f. 390, 391 (1806–27).

Papilio Jasoniades, Machaon, *Hübner, Verz. bek. Schmett.* 83 (1816).

Amaryssus, Machaon, *Dalm. Kong. Vet. Acad. Holm.* xxxvii. 85 (1816).

Papilio Sphyrus, *Hübner, Europ. Schmett. Pap.* f. 776, 777 (1823?).

Europe, India, Japan, North China.

PARNASSIUS, *Latreille*.

3. PARNASSIUS GLACIALIS, sp. n.

Alæ supra subhyalinæ, albæ, venis nigris: *anticæ* apice hyalino; cella media fasciata fasciaque brevi terminata, fasciis cinereis: *posticæ* margine abdominali late nigro: *corpus* nigrum, thorace præ ferrugineo; abdomine cinereo pilosato, a latere ferrugineo; antennæ nigræ. Alæ subtus nitentes: *posticæ* margine abdominali cinereo; aliter velut supra: *corpus* nigrum, pilis ferrugineis sparsum.

Alar. exp. unc. $2\frac{6}{8}$–$2\frac{13}{16}$.

This beautiful species is most closely allied to *P. Mnemosyne*, Latreille (South Europe). It differs from it in its greater size,

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[*] The specimen is now in the Museum of the Royal College of Surgeons, which was already in possession of a similar monstrosity, apparently in the same species of Snake.

[†] Alæ anticæ subtus latè fuscæ: posticæ caudis vix spathatis; supra macula anali minus conspicua; subtus prope marginem luteo roratæ, maculis submarginalibus minus lunulatis, macula anali his haud distinguenda.

P. Mnemosyne measuring from $2\frac{3}{8}$ to $2\frac{5}{8}$ inches; also in having grey bands instead of black spots in the front-wing cell, the whole of the wings, instead of only the apical area, being semitransparent; no discal spot in the hind wings, as usually the case with *P. Mnemosyne*; a much broader extent of black at the abdominal margin, and the ferruginous hairs of the body much more vivid.

LEUCOPHASIA, *Stephens*.

4. Leucophasia Sinapis, *Linnæus*, sp., var. (costa anticarum elongata).

Papilio Sinapis, *Linnæus, Syst. Nat.* ii. 760. n. 79 (1767); *Hübner, Europ. Schmett. Pap.* f. 410, 11 (1806–27).
Leucophasia Sinapis, *Stephens, Ill. Haust.* i. 24 (1827).
Leptosia Lathyri, *Hübner, Verz. bek. Schmett.* 95 (1816).
Leptosia candida, *Westwood* in *Humphr. Brit. Butterf.* 31 (1840).
Europe, Syria.

Note. The Japanese form of this insect differs from the European one in having the front wings three-sixteenths longer in proportion to their breadth at the widest part; the apical patch is also only marked by the nervures.

PIERIS, *Boisduval*.

5. Pieris Cratægi, *Linnæus*, sp.

Papilio Cratægi, *Linnæus, Syst. Nat.* ii. 758. n. 72 (1757); *Hübner, Europ. Schmett. Pap.* f. 339, 340 (1806–27).
Aporia Cratægi, *Hübner, Verz. bek. Schmett.* 90 (1816).
Pieris Cratægi, *Godart, Enc. M.* ix. 154. n. 127 (1819).
Pontia Cratægi, *Donzel, Ann. Soc. Ent. de France*, vi. 88 (1837).
Europe, Syria.

6. Pieris Rapæ, *Linnæus*, sp.

Papilio Rapæ, *Linnæus, Syst. Nat.* ii. 759. n. 76 (1767); *Hübner, Europ. Schmett. Pap.* f. 404, 5 (1806–27.)
Pieris Rapæ, *Godart, Enc. M.* ix. 161. n. 144 (1819).
Catophaga Rapæ, *Hübner, Verz. bek. Schmett.* 93 (1816).
Europe, North Asia, Cachemire, Egypt.

7. Pieris Napi, *Linnæus*, sp., var. (alis multo majoribus).

Papilio Napi, *Linnæus, Syst. Nat.* ii. 760. n. 77 (1767); *Hübner, Europ. Schmett. Pap.* f. 406, 7 (1806).
Pieris Napi, *Godart, Enc. M.* ix. 161. n. 145 (1819).
Pontia Napi, *Stephens, Ill. Haust.* i. 20 (1827).
Catophaga Napi, *Hübner, Verz. bek. Schmett.* 93 (1836).
Europe, Siberia.

Note. The Japanese form is one-third longer in expanse of wing than the average size of British specimens.

ANTHOCHARIS, *Boisduval.*

8. ANTHOCHARIS SCOLYMUS, sp. n.

♂ *Alæ anticæ* elongatæ, costa ad venæ costalis finem directa, apice falcato; margine postico obliquo, sub unco sinuato; margine anali convexo; supra niveæ, basi costaque apicali cinereis, apice nigro maculis quatuor luteis interrupto, tertia permagna, alteris minimis, cella macula elongata reniformi nigra terminata.

Alæ posticæ piriformes, supra niveæ notis inconspicuis per alas indicatis, macula nigra in costa apicali, venis nigro acuminatis.

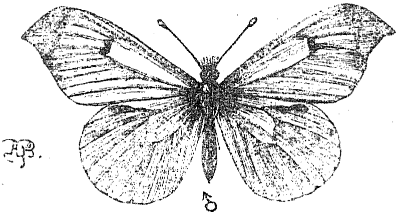
Corpus fuscum; capite olivaceo-pilosato.

Alæ anticæ subtus viridi pro fusco cinereoque, maculis albis nec luteis, aliter velut supra. *Alæ posticæ* virides, maculis albis valde irregularibus variegatæ, margine postico pallidiore, maculis marginalibus hastatis inter venas dispositis.

Corpus cinereum, viridi pilosatum.

Alar. exp. unc. $2\frac{1}{16}$.

Most closely allied to *Anthocharis Genutia*, Bd. (United States), but very distinct.



COLIAS, *Boisduval.*

9. COLIAS HYALE, *Linnæus* sp.

Papilio Hyale, *Linnæus, Syst. Nat.* ii. 764. n. 100 (1767).
Pieris Hyale, *Latreille, Gen. Crust. et Ins.* xiv. 113 (1805).
Colias Hyale, *Ochsenheim. Schmett. von Europa*, iv. 32 (1816).
Papilio Palæno, *Hübner, Europ. Schmett. Pap.* f. 438, 439 (1805?).

Europe, Central India.

10. COLIAS PALLENS, sp. n.

Alæ supra fulvæ, ciliis rufis: anticæ pallidæ, elongatæ, angustæ, cella macula nigra terminante, apice cinereo, maculis duabus pallidis subapicalibus; margine postico pallido, cinereo: posticæ cinereo roratæ, basi nigrescentes, margine apicali fusco, apud angulum analem pallente maculas quatuor fulvas includente; cella macula flava terminante: corpus cinereum, præ rubescens, antennis rufis. *Alæ anticæ* subtus fulvæ, margine interiore pallido, apice flavo, margine anali punctis tribus nigris submarginato; cella macula terminante. *Alæ posticæ* flavæ, valde cinereo roratæ, costa post cellam macula rufo-fusca;

cella macula argentea terminante, fusco bicincta punctoque fusco præposito.

Corpus flavum, abdomine pallido. *Alar. exp.* unc. $1\frac{9}{16}$.

Allied to *Colias Hyale*, from which it chiefly differs in its smaller size, elongated narrow front wings, and pale submarginal markings.

ARGYNNIS, *Ochsenheim.*

11. ARGYNNIS MIDAS, sp. n.

Alæ anticæ costa convexa, apice rotundato anguloque anali acuto: supra maculis ut in *A. Paphia* dispositis, venis autem excipe medianam tertiam nec fuscis.

Alæ posticæ quadratæ, area apicali maculis ut in *A. Paphia* dispositis sed majoribus; cella maculis sex terminata in triangulo positis.

Alæ anticæ subtus pallidiores, cella maculisque ut in *A. Paphia*, area apicali maculis olivaceis obscurissimis.

Alæ posticæ nitentes, ochreæ, pallidæ, fasciis maculisque olivaceis variæ, fascia una media indistincta argentea lunulata punctisque nonnullis argenteis inter venas positis. *Corpus* pallidum ochreo-album. *Alar. exp.* unc. $2\frac{5}{8}$.

Allied to *Argynnis Paphia* (Europe), from which, however, it may be readily distinguished by its greater size. *Front wings*, costa and apex more rounded, longer inner margin; *above* larger, and only the first median margined with black; *hind wings* more quadrate; *above* with a triangular patch of large black spots at the end of the cell. *Front wings* below with the markings of the outer margin indistinct. *Hind wings*, the markings very obscure, only one central silvery band, which is distinctly lunulated.

12. ARGYNNIS ADIPPE, *Linnæus*, sp.
Var. *Arg. Chloradippe* (anticæ maculis subapicalibus argenteis).
Papilio Adippe, *Linnæus, Syst. Nat.* ii. 786. n. 212 (1767).
Acidalia Adippe, *Hübner, Verz. bek. Schmett. Pap.* 31 (1816).
Argynnis Adippe, *Ochsenheimer, Schmett. von Europa,* iv. 15 (1816).
Papilio Cydippe, *Fauna Suecica,* n. 1066 (1761).
Papilio Berecynthia, *Poda, Mus. Græc.* 75 (1761).
Europe.

13. ARGYNNIS LAODICE, *Pallas,* sp.
Papilio Laodice, *Pallas, Reise, App.* 470 (1771).
Argynnis Laodice, *Ochsenheimer, Schmett. von Europa,* iv. 15 (1816).
Papilio Cethosia, *Fabricius, Ent. Syst.* iii. 1143. n. 440 (1793).
Eastern Europe.

14. ARGYNNIS DAPHNE, *Fabricius,* sp.
Papilio Daphne, *Fabricius, Mant. Ins.* ii. 64. n. 602 (1787); *Hübner, Samml. Europ. Schmett. Pap.* f. 4, 5, 6 (1806–27).

Argynnis Daphne, *Ochsenheimer, Schmett. von Europa*, iv. 15 (1816).
Brenthis Daphne, *Hübner, Verz. bek. Schmett.* 30 (1816).
Papilio Chloris, *Schneider, Syst. Beschr.* 191. n. 108 (1787).
Switzerland, Germany, South of France.

ARASCHNIA, *Hübner.*

15. ARASCHNIA STRIGOSA, sp. n.

♂. *Alæ anticæ* costa elongata; *posticæ* margine postico valde sinuato, cauda media obtusa.

Alæ supra area basali fusca, strigis ferrugineis pallidis interrupta, fascia media obliqua pallida apud marginem abdominalem bifurcata. *Anticæ* ocello subapicali fusco, albo pupillato, maculisque albis striga ferruginea inclusis submarginatæ; *posticæ* ocellis nigris, fascia lata inclusis submarginatæ. *Corpus* fuscum.

Alæ subtus area basali ferrugineo, fusco alboque variæ; venis albis, fasciaque distincta media alba, ad marginem interiorem bifurcata, ramisque tenuissimis obliquis ad costam basalem anticarum currentibus; area apicali ferruginea, macula magna media violacea, maculisque ochreis variegata, fascia media extus fusco marginata punctisque octo albis inter venas positis; margine postico pallido lineis duabus nigris marginato, posticisque fascia cinerea albo interrupta et marginata. *Corpus* cinereum. *Alar. exp.* unc. 1¾.

♀. *Alæ anticæ* costa brevi; *posticæ* margine postico minus sinuato, cauda media distincta.

Alæ subtus fasciis pallidis angustis, margine postico angusto.
Alar. exp. unc. 1½ *.

PYRAMEIS, *Hübner.*

16. PYRAMEIS CARDUI, *Linnæus*, sp.

Papilio Cardui, *Linnæus, Syst. Nat.* ii. 1774. n. 157 (1767); *Hübner, Samml, Europ. Schmett. Pap.* f. 73, 74 (1806).
Vanessa Cardui, *Hübner, Verz. bek. Schmett.* 33 (1816).
Cynthia Cardui, *Steph., Ill. Haust.* i. 47 (1827).
Papilio Carduelis, *Cramer, Pap.* t. 26. f. E, F (1775).
Europe, Asia, Africa, America, Australia, Oceania.

NEPTIS, *Fabricius.*

17. NEPTIS LUCILLA.

Papilio Lucilla, *Wiener Verz.* 173, 4.
Nymphalis Lucilla, *Hübner, Schmett.* f. 101, 102 (1805–24).
Acca Lucilla, *Hübn. Verz. bek. Schmett.* p. 44, n. 394 (1816).
Limenitis Lucilla, *Boisduval, Gen. et Ind. Méth.* p. 16 (1840).
Neptis Lucilla, *Westwood, Doubl. & Hewits. Gen. Diurn. Lepid.* p. 272. n. 8 (1850).
Austria, South Russia, China.

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* Closely allied to *Araschnia Prorsa*, Godt. (Europe), but quite distinct.

18. Neptis Aceris, *Esper*, sp.
Papilio Aceris, *Esper, Schmett.* t. 1. f. 3, 4 (1777–1780).
Acca Aceris, *Hübner, Verz. bek. Schmett.* p. 44. n. 393 (1816).
Nymphalis Aceris, *Godart, Enc. M.* ix. p. 430. n. 255 (1819).
Limenitis Aceris, *Boisduval, Icon. Hist.* t. 18. f. 2 (1829–36).
Neptis Aceris, *Westw. Doubl. & Hewits. Gen. Diurn. Lepid.* (1850).
Papilio Plautilla, *Hübner, Europ. Schmett. Pap.* t. 99, 100 (1805–24).
Germany, Hungary, South Russia.

Limenitis, *Fabricius.*

19. Limenitis Sibilla, *Linnæus*, sp.
Papilio Sibilla, *Linnæus, Syst. Nat.* ii. 781. n. 186 (1766); *Rösel, Ins. Belust.* iii. t. 33. f. 3; t. 70. f. 1–3 (1822–25).
Limenitis Sibilla, *Westw. Doubl. & Hewits. Gen. Diurn. Lepid.* p. 276, n. 5 (1850).
Papilio Prorsa, *Linnæus, Mus. Rep.* p. 303. n. 121.
♀ Papilio Camilla, *Linnæus, Syst. Nat.* ii. 781. n. 187 (1766).
Europe.

Debis, *Westwood.*

20. Debis Diana, sp. n.

Alæ supra fuscæ; *anticæ* fascia obliqua subcostali brevi pallida post cellam posita; *corpus* fuscum.

Alæ subtus fuscæ: *anticæ* fascia alba triangulari, ad angulum analem coarctata; cella lineis duabus nigro-fuscis; margine postico lineis duabus pallidis marginato ocellisque tribus nigris albo pupillatis fulvo, fusco ochreoque circumcinctis submarginato. *Posticæ* lineis duabus mediis super cellam, ad costam approximantibus; margine postico lineis duabus pallidis marginato ocellisque sex submarginato, primo quintoque majoribus. *Alar. exp.* unc. $1\frac{6}{8}$.

Allied to *Debis Dinarbas*, Hewitson, but *front wings* comparatively shorter; *hind wings* shorter; costa suddenly arched above the apical ocellus; outer margin much more rounded; central caudal projection almost obsolete; inner margin proportionably much longer.

In coloration and markings it differs as follows:—Upperside, *front wings* with only one pale, oblique, transverse band, two-thirds distant from the base; hind wings not showing submarginal ocelli. Underside olivaceous, instead of reddish brown: *front wings*, transverse band broad at the costa, dirty white, tapering to near the anal angle; subapical ocelli distinct; submarginal lines not waved: *hind wings*, central portion broad in the middle as in *Debis Chandica*, Moore; submarginal ocelli slightly larger, the one at the anal angle unequally bipupillate.

NEOPE, *Moore.*

21. NEOPE PULAHA, *Moore*, sp.
Lasiommata? Pulaha, *Moore, Cat. Lep. Mus. East. Ind. Comp.* p. 327. n. 477.
India, Japan.

YPHTHIMA, *Hübner.*

22. YPHTHIMA ARGUS, sp. n.

Alæ supra fuscæ; *anticæ* ocello subapicali nigro ochreo cincto alboque bipupillato; *posticæ* maris ocellis duobus inter venas apud marginem analem positis; feminæ ocellis tribus, uno subapicali minuto. *Corpus* fuscum.

Alæ subtus albo-cinereæ, fusco strigosæ; *anticæ* maris ocello ut supra; feminæ ocello obscuro albo ad cellæ finem; *posticæ* ocellis quinque subapicalibus tribusque analibus, uno anali bipupillato. *Corpus* cinereum. *Alar. exp.* unc. 1½.

Allied to *Yphthima Baldus*, Fabricius (China); differs from it in having five instead of six ocelli on hind wings.

Front wings: costa longer; female showing an extra ocellus at the end of the cell below, also with a small subapical ocellus above.

POLYOMMATUS, *Latreille.*

23. POLYOMMATUS EUPHEMUS, *Hübner*, sp.
Papilio Euphemus, *Hübner, Eur. Schmett. Pap.* f. 257-259 (1805-24); *Ochsenheimer, Schmett. von Europa* (1816).
Lycæna Euphemus, *Westw. Doubl. & Hewits. Gen. Diurn. Lepid.* p. 491. n. 74 (1852).
Papilio Autophylax, *Bergstr. Nom.* t. 51. f. 1, 2 (1779-80).
Papilio Autophonus, *Bergstr. Nom.* t. 53. f. 7, 8.
Papilio Argiades, *Fabricius, Mant. Ins.* ii. p. 70 (1787-88).
Papilio Diomedes, *Naturforsch.* vi. p. 26. n. 14.
Central Europe.

24. Polyommatus Argiolus, *Linnæus*, sp.
Papilio Argiolus, *Linnæus, Syst. Nat.* ii. p. 746 (1766); *Lewin, Brit. Butterf.* t. 36. f. 3 (1795).
Lycæna Argiolus, *Westw. Doubl. & Hewits. Gen. Diurn. Lepid.* p. 491. n. 61 (1852).
Papilio Thersanon, *Bergst. Nom.* t. 49. f. 5, 6 (1779-80?).
Papilio Argyrophontis, *Bergstr. Nom.* t. 58. f. 5, 6.
Papilio Argalus, *Bergstr. Nom.* t. 60. f. 45.
Hesperia Acis, *Fabricius, Ent. Syst.* iii. pt. i. p. 295 (1793).
Papilio Cleobis, *Esper, Eur. Schmett.* t. 40 (1777-80); *Suppl.* 16, f. 3, t. 54; *Cont.* 4, f. 4 a, b (1805-24).
Europe.

25. POLYOMMATUS AMYNTAS.

Papilio Amyntas, *Wiener Verz.* p. 185; *Hübner, Eur. Schmett. Pap.* p. 322–324 (1805–24).

Lycæna Amyntas, *Westw. Doubl. & Hewits. Gen. Diurn. Lepid.* p. 490. n. 45 (1852).

Papilio Tiresias, *Esper, Pap. Eur.* pl. 34 (1777–1780); *Suppl.* 10, f. 1, 2 (1805).

Southern Europe. China.

26. POLYOMMATUS LYCORMAS, sp. n.

♂. Alæ supra cæruleæ, nigro marginatæ, ciliis albis. *Corpus* cæruleo-cinereum; antennis nigris, albo fasciolatis.

Alæ subtus pallide cinereæ, basi cæruleo-virides; *anticæ* serie macularum septem nigrarum albo cinctarum apud marginem posticum. *Posticæ* apud basim macula una, fascia irregulari punctorum nigrorum albo cinctorum de costa ad marginem posticum currente. *Corpus* pallide cinereum.

♀. Alæ supra fuscæ, ciliis albis; corpus cinereo-fuscum; subtus velut mari. *Alar. exp.* unc. 1¼.

Allied to *Lycæna Iolas*, Ochsenheimer (Europe), differs from it above, in the male having a broad marginal black band to the wings, and the female being entirely black brown; below, in having no marginal spots, and the submarginal band of spots in the front wings being regular. Hind wings with no spots within the cell.

In markings it more closely resembles *Lycæna Bellis*, from which it scarcely differs, except in its much greater size.

LYCÆNA, *Fabricius*.

27. LYCÆNA FERREA, sp. n.

Alæ supra chalybeo-cæruleæ, marginibus cinereo-fuscis.

Alæ anticæ subtus cinereo-fuscæ, cella fusco terminata, fascia post cellam angulata fusca extus pallida post nervulum medianum secundum terminante; *posticæ* fusco-rufescentes, area abdominali cinereo roratæ, fascia pallida post cellam valde irregulari, ad costam intus albo marginata. *Corpus* fuscum. *Alar. exp.* unc. 1⅛.

Note.—Our specimen of this insect has the outer margins of the wings much shattered: it seems to have possessed two tails to the hind wings, one at the termination of the first, and the other of the second median nervule, the anal angle also being obtusely produced.

THECLA, *Fabricius*.

28. THECLA ICHNOGRAPHIA, sp. n.

Alæ supra chalybeo-purpureæ, ad marginem posticum fuscescentes;

posticæ angulo anali in caudam obtusam rufam nigro cinctam producto, venaque mediana prima cauda tenui terminante. *Corpus* fuscum.

Alæ anticæ subtus niveæ, basi fusco-pallidæ, cella ante finem fascia tenui alba, fascia obliqua fusca pallida post cellam posita et ante marginem interiorem terminata; margine postico nigro marginato fasciisque duabus fuscis pallidis submarginato, interiore venis albis interrupta; *posticæ*, area abdominali fusco-pallida, lineis tribus albis apud marginem analem cellaque ante finem linea alba scripta, fascia obliqua fusco-pallida post cellam posita et a veno mediano secundo terminata, margine postico nigro marginato, apicali fasciis duabus pallidis submarginato, interiore venis albis interrupta, angulo anali macula lata quadrata flava maculas quatuor nigras ex æquo distantes includente, cauda anali nigra. *Corpus* pallidum, cinereo-fuscum. *Alar. exp.* unc. $1\frac{3}{16}$.

Allied to *T. Battus*, Cramer.

CHRYSOPHANUS, *Hübner.*

29. CHRYSOPHANUS PHLŒAS, *Linnæus*, sp.

Papilio Phlœas, *Linnæus, Syst. Nat.* ii. p. 793 (1766); *Hübner, Eur. Schmett. Pap.* f. 362, 363 (1805–24).

Chrysophanus Phlœas, *Westw. Doubl. & Hewits. Gen. Diurn. Lepid.* p. 498. n. 4 (1852).

Papilio Virgaureæ ♀, *Scopoli, Ent. Carn.* p. 181 (1763).

Europe, Nova Scotia, United States, Himalayas.

29^a. Var. *Alæ anticæ* macula magna fusca sub cellæ fine posita.

THANAOS, *Boisduval.*

30. THANAOS RUSTICANUS, sp. n.

Alæ anticæ supra basi cinereo-fuscæ, lunula nigra apud basim cella inclusa, fascia media extus ochreo-pallida intus olivaceo-fusca lineis nigris marginata et divisa, area apicali cinereo-fusca fasciis olivaceo-fuscis variegata, linea submarginali lunulata pallida; *posticæ* nigro-fuscæ, macula media oblonga brevi ochrea macularumque seriebus duabus submarginalium. *Corpus* nigro-fuscum.

Alæ anticæ subtus basi fuscescentes, fasciis duabus fuscis obsoletis post cellam positis et apud marginem interiorem conjunctis, margine postico linea fusca lunulata submarginato; *posticæ* velut supra. *Corpus* fuscum. *Alar. exp.* unc. $1\frac{7}{16}$.

PAMPHILA, *Fabricius.*

31. PAMPHILA SYLVANUS, *Fabricius*, sp.

Papilio Sylvanus, *Fabricius, Mant. Ins.* ii. p. 84 (1787–88); *Lewin, Brit. Butterf.* t. 46. f. 1–3 (1795).

Pamphila Sylvanus, *Westw. Doubl. & Hewits. Gen. Diurn. Lepid.* p. 522. n. 2 (1852).

Papilio Comma, *Scopoli, Carn.* No. 463 (1763).
Papilio Melicerta, *Bergstr. Nomenkl.* t. 90. f. 1–4 (1779–80).
Europe, England.

Remarks on the Cranial and Dental Characters of the existing Species of *Hyæna*. By George Busk, Esq., F.R.S., Sec. L.S.

[Read May 3, 1866.]

The following observations refer more especially to two points concerning which considerable doubt and confusion have hitherto existed.

(1.) Three, or, as some zoologists have supposed, four species of the genus *Hyæna* are at present in existence; and it is probable that palæontology is acquainted with at least three, and perhaps more, extinct forms. It is not my intention here to advert further to the fossil species than to state that, like the existing ones, they fall into two very natural groups of subgeneric value, and that with respect to some among them it has hitherto been found very difficult, and in some cases impossible, to distinguish them from their existing representatives.

The existing or supposed species of *Hyæna* are:—

1. Hyæna striata, *Zimmerman.*
H. orientalis, *Tiedemann.*
H. vulgaris, *Desmarest.*
H. fasciata, *Thunberg.*
H. antiquorum, *Temminck.*
H. veterum, *Kæmpfer* (*Amœn. Exotic.* 1712, p. 411).
Canis Hyæna, *Linn.*, *Erxleben,* &c. (*Syst. Anim.* 1777).
Lupus marinus, *Gesner.*
Hyène rayée, *Cuvier.*
Striped Hyena, *Pennant.*

2. H. brunnea, *Thunberg* (*Vetensk. Acad. Handl.* 1820, p. 59).
H. fusca, *G. St. Hilaire.*
H. villosa, *Smith* (*Linn. Trans.* xv. 1827, p. 462).
Hyène dont la patrie est inconnue, *Cuvier, Oss. fossil.* 4th ed. 1835, viii. p. 318.
The Strand Wolf *of the Cape.*

3. H. crocuta, *Erxleben* (sp.), *Syst. Règne Animal,* 1777, p. 575.
H. maculata, *Thunberg* (non *Ödmann*).
H. capensis, *Desmarest.*
Canis crocuta, *Erxleben.*
Crocuta maculata, *Kaup* (*Isis,* 1828, p. 1144).

Hyæna sive congener illi Crocuta, *Ludolf.* (*Hist. Æthiop.* l. i. c. 10).
The Spotted Hyena, *Pennant.*
The Tiger Wolf *of the Cape.*

4. H. MACULATA, *Ödmann* (*Vetensk. Acad. Handl.* xi. 1, 1820, p. 65).

The first two of these species are distinguished by certain well-marked dental characters, and have on that account and from other peculiarities (according to Kaup, the possession of the anal sacculus) been placed by some zoologists in a distinct genus or subgenus, for which the late Dr. Falconer had proposed to employ the term *Euhyæna*; and, in like manner the last species or last two species, constitute the subgenus, or genus, as some regard it, of *Crocuta*, first so named by Kaup. And to this group belongs the commonest form of fossil or Cave Hyena, *H. spelæa.*

The remarks here offered are intended, in the first place, to point out the distinction that may be drawn from the cranial and dental characters alone, between *H. striata* and *H. brunnea*; and secondly, to inquire what evidence is afforded by those characters, in favour of or against the supposition that there is more than one distinct form of "Spotted Hyena."

It might be thought that there is little reason or use in entering into a critical examination of such a limited range of parts, concerning the distinctive characters of two such well-marked and undoubted species as *H. striata* and *H. brunnea.* For the mere purpose of distinguishing these forms zoologically, there are, it is quite true, abundant materials in other striking and obvious characters; but when we come to the distinction of species by the bones alone, and more especially to that of the fossil species, and their relationship to existing forms, it becomes a question of the utmost interest to ascertain as precisely as possible the characters derived from the more imperishable and most frequently met with parts of the frame, amongst which the cranium and teeth are perhaps the most important.

With reference to this, and to show how much the importance of such an inquiry has been felt by palæontologists, I will quote some remarks which I find in the notes of the late Dr. Falconer on the subject of the fossil Hyena from the bone breccia of Gibraltar, to the study of which he had devoted a great amount of labour. He says, "It has been long known to palæontologists that remains of fossil Hyenas specifically distinct from *H. spelæa* abound in the ossiferous caves of the South of France. Latterly they have been detected under similar circumstances in Sicily. But the opinions entertained respecting the specific determination of these fossil forms and their relations to existing Hyenas have been very conflicting. Much of this uncertainty has doubtless arisen from the imperfect nature of the materials which have come before the different observers; but we believe that it has in a considerable measure been owing to the unsettled opinions among zoologists respecting the number and affinities of the living species, and to the imperfect state of knowledge regarding their osteological distinctive characters, more especially in what relates to the form of the cranium and teeth.'' He then proceeds to observe, "We shall endeavour before entering upon the description of the Gibraltar fossil form to determine what the osteological distinctions of the living species are." And it is very deeply to be lamented that he did not live to carry out this useful design, towards which the present remarks may be regarded as a contribution.

(2.) But before proceeding to the description of the differences between *H. striata* and *H. brunnea*, I should wish to be allowed to say a few words on the circumstances which have more immediately led to the confusion which exists with respect to *H. brunnea*, at any rate among English palæontologists. As an instance of this it may be stated that Dr. Falconer, than whom no man justly stands higher as an authority in Mammalian Palæontology and Osteology, and my friend Mr. Boyd Dawkins, who bids fair to become his worthy successor, have both assigned to *H. brunnea* three crania which most indubitably do not belong to that species, nor even to the same subgenus, and in consequence of this mistake have been induced to regard *H. spelæa* as closely allied to if not identical with the "Strand Wolf" of the Cape of Good Hope; and I may add that I was myself also naturally led to the same conclusion. The way in which such competent observers as Dr. Falconer and Mr. Boyd Dawkins were led into this error, may, however, be very simply explained.

The only materials, so far as I know, publicly available in London for the study of the osteology of the cranium of the *Hyæna* are to be found in the British Museum and in the Royal College of Surgeons.

In the former place they comprised, until lately, (1.) two skulls of *H. crocuta*, numbered 1232 (*a*) and 1232 (*b*), and another so named in the Palæontological Gallery, numbered 37783; (2.) two skulls, one a good deal broken, named *H. brunnea*, and numbered respectively 822 (*a*) and 822 (*b*); and (3.) a good many skulls of *H. striata*.

In the Museum of the Royal College of Surgeons the materials afforded are (1.) a very fine cranium with the teeth in beautiful condition, named *H. crocuta*, and numbered 4447; (2.) a skull belonging to the entire skeleton of a "Spotted Hyena," which when alive was in the possession of the late Dr. Buckland; and (3.) several crania of *H. striata*.

With respect to the Striped Hyena of course no question could arise; and with respect to the others, as there appeared to be no reason to doubt the correctness of the appellations bestowed upon them, it was naturally assumed that the two crania named *H. brunnea* in the British Museum afforded types of that species. And indeed, as will afterwards appear, upon comparison of these two crania with those of undoubted specimens of *Hyæna crocuta* in the same collection, sufficient differences are at first sight apparent between them to justify any one, in the absence of direct testimony to the contrary, in supposing that they belonged to distinct species. An additional piece of evidence was also believed to be forthcoming, which would have been conclusive as to the point to which species these crania belonged, inasmuch as in the Catalogue an asterisk prefixed to one of them was taken to imply that the stuffed skin of the animal was also in the national collection. Upon comparison again of these two specimens with that numbered 4447 in the Royal College of Surgeons, which was widely different from the cranium belonging to Dr. Buckland's specimen of *H. crocuta*, the characters of the three, allowing for differences of age, &c., were so similar that Dr. Falconer was persuaded that they all three belonged to one and the same species, and that that species was closely allied to if not identical with the fossil Hyena from Gibraltar, and, in all probability, also with *H. spelæa*. He therefore was led to the conclusion that the "Strand Wolf" of South Africa had at one time extended as far North as Gibraltar at least, if indeed it had not at a still remoter period abounded in far more distant northern latitudes. Biassed no doubt by the weight of Dr. Falconer's opinion, Mr. Boyd Dawkins, in his valuable paper on the Dentition of *Hyæna spelæa**, adopted the same view; and, as I have said, it appeared to me also an inevitable conclusion from the premises. No mistake, however, could be greater, or, in a palæontological sense, attended with more important consequences.

Unable to reconcile Mr. Boyd Dawkins's account of the supposed *H. brunnea*, taken from the specimens 822 (*b*) in the British Museum, and 4447 in the College of Surgeons, with what he himself had always regarded as *H. brunnea* or *fusca*, M. Lartet, on the occasion of my being about to visit Paris a short time since, requested me to bring him casts of the dentition of the two specimens in question. Time however only allowed me to procure that of the College of Surgeons specimen. Comparison of this with specimens of *H. crocuta*, *H. striata*, and the true *H. brunnea* in M. Lartet's possession, showed at once that it belonged to the first-named species, or at any rate to the same type, and that it had nothing in common with *H. brunnea*, except perhaps its size. It was from this further evident also that we had no known specimen of that species either in the British Museum or the College of Surgeons. Under these circumstances on my return to London bringing with me an excellent cast of the dentition of *H. brunnea*, I took the first opportunity of making a close examination and comparison of the various Hyena-crania to which I had access. The comparison of the so-termed *Hyæna-brunnea* skulls in the British Museum with those named *H. crocuta* in the same collection, soon satisfied me that there was no essential difference between them sufficient to justify their specific distinction. On further inquiry it also appeared that there was no stuffed skin belonging to either of the crania assigned to *H. brunnea*; nor was I able to learn from Dr. Gray that there were any grounds for attributing them to that species, beyond the circumstance that they had been purchased as such at Mr. Warwick's sale. As they really appeared to differ very considerably from the other two skulls which were certainly known to belong to the "Spotted Hyena," and as no materials were at hand for comparison, no suspicion appears ever to have been entertained that they were misnamed. But in consequence of this absence of any proof that they belonged to *H. brunnea*, and in the presence of their absolute distinctness from that species as exemplified in the cast I had brought from Paris, the conclusion appeared inevitable that the name under which they had been entered in the Catalogue was erroneous. Had any doubt, however, remained on this point, it would have been removed when Mr. Gerrard produced a skin of the veritable *H. brunnea*, containing the skull. But on examination of this specimen it appeared that the bones had been detached from the skin, and then sewn up again in it. When removed it appeared that they had been cleaned; and the name of *H. brunea* (*sic*) was written on both the cranium and the mandible, which latter, however, was found to belong to another individual, of smaller size. This circumstance naturally led to the surmise that both the cranium and jaw might both have been substituted for those really appertaining to the hide; but on examination it was clear enough that the latter fitted too exactly to the upper jaw and cranium to admit of any doubt of their belonging to each other. The introduction of a smaller lower jaw of the same species is a curious circumstance, but of no immediate importance.

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* Nat. Hist. Review. No. [illegible]V[illegible] p. 80, Jan. 1865.

Comparison of the dentition of these two jaws with the cast of that of *H. brunnea* proved at once that they were identical, and it was thus shown that the national collection was really in possession of a skull of *H. brunnea*. I am happy to say also that Dr. Gray, with his accustomed zeal in the cause of science, has procured from Paris an excellent specimen of the entire cranium of that species, which he has kindly allowed to be exhibited on the present occasion*.

(3.) After this little historical episode, which will serve at any rate to point out the necessity of the utmost caution in doubtful cases, and of the danger of taking anything for granted, I shall proceed to indicate as briefly as I can the chief distinguishing characteristics between *H. brunnea* and *H. striata*, the only existing species with which it can possibly be confounded. But that it can be so confounded, and that by the very ablest observers, will be apparent when it is stated that M. de Blainville, who has given such an excellent figure of the head and teeth of *H. brunnea* in his 'Osteography,' observes that it is impossible to distinguish one from the other by the cranial characters, and consequently is disposed to consider *H. brunnea* only a variety of *H. striata*. And, again, Dr. Falconer, in noticing the actual specimen in the Museum of the Jardin des Plantes from which De Blainville's figure was taken, says with respect to it "that the famous *Hyæna fusca* of Caffraria, brought in 1839 by M. Forestier, and figured by De Blainville, is a true *Euhyæna*, the skull differing in no respect from the skulls of *H. striata*, except in being somewhat larger;" but the "teeth," he says, "differ in this important respect, that the last molar in the lower jaw has not the posterior cusp with an additional cusp developed inside. There is only an adpressed rudiment barely distinguishable. The talon also, though of the same form, is less developed on its crown surface. This tooth on the whole approaches in form more that of the *Crocottas*. The carnassier of the upper jaw has three subequal lobes, exactly as in *Hyæna striata*; and the last or tubercular is exactly alike; the last lobe of the carnassier is less indented in *H. fusca*. This, then," he remarks, "is the *true H. fusca* of E. and G. St. Hilaire."

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* I am also able to add that, since this paper was read, the Royal College of Surgeons has procured two excellent crania of *H. brunnea*, the additional materials afforded by which I have incorporated in the text and in the Tables.

A subsequent note, also made in the Jardin des Plantes, shows how much he was puzzled about *H. brunnea*, as well he might be; and again on the occasion of a visit to examine the Hyæna-skulls in the British Museum, he writes, "Examined the two skulls, *H. crocuta* and *brunnea*. Gray, Cat. p. 69, cites *H. fusca* as a synonym; but this is a mistake;" and he ends the note by saying that he "believes there are four species living, viz.:—

H. crocotta or *maculata*.
H. brunnea.
H. (*Euhyæna*) *fusca*.
H. (*Euhyæna*) *striata*."

I make these quotations from the brief notes of my lamented friend, not only to show how confused the subject of the different existing species of *Hyæna* was in his mind, and consequently how useful it would be to have it definitively settled for succeeding palæontologists, but also because I am unwilling that anything which can be rescued from his notes should be lost. In the quotation above given it will be seen that his keen and penetrating eye had really perceived the more essential among the dental characters distinguishing *H. striata* from *H. brunnea*, although, from the mistake with regard to the latter species into which he had almost inevitably been led, he, like De Blainville, overlooked the true significance of what he had noticed.

H. striata and *H. brunnea*, so far as regards cranial and dental characters, agree in so many particulars as upon superficial inspection to be readily confounded. The chief points in which they agree are also those in which they both differ from *H. crocuta* and its fossil congeners.

1. In both, the upper tubercular molar is triradicular and tricuspid, and rarely less than 0·5 of an inch in length by 0·2 in its shorter diameter; while in *H. crocuta* and its allies this tooth is normally biradicular and bicuspid, though not unfrequently, by abortion, uniradicular, or entirely absent; and it is never more than 0·2 or 0·21 in length by 0·1 in the shorter diameter.

2. In having the three lobes of the upper carnassial tooth subequal in the antero-posterior direction.

3. In having a more or less distinct accessory point on the inner side of the hinder cusp of the lower carnassial tooth. It is true that a minute tubercle, or rudiment, rather, of a similar point is not unfrequently seen in nearly the same situation in *H. crocuta*, and perhaps still more frequently in *H. spelæa*. But in these species it never assumes anything like the size it presents in *H. striata* and *H. brunnea*, though it is considerably less in the latter species than in the former. Some difference also may be noticed in the exact situation of the accessory point in *H. crocuta* and *spelæa*, in which species it is usually situated as it were in a hollow beneath the base at the inner and hinder border of the posterior cusp; whilst in *H. striata* and *brunnea* it rises distinctly on the inner face of the cusp.

Other points of agreement between the two Euhyænas may be noticed—as for instance the presence in both of a distinct anterior talon to the 2nd premolar, and of a well-defined anterior talon to the 1st, 2nd and 3rd premolars, which is larger, however, as are all the talons in fact, in *H. striata*. In *H. striata* and *H. brunnea*, the 2nd and 3rd premolars are placed with their long axis oblique to the line of the alveolar border, and the 3rd premolar is obliquely truncated behind, whilst in *H. crocuta* this tooth is square behind.

The opening of the nares is rounded in *H. crocuta*, and more or less pyriform in *H. striata* and *H. brunnea*, in which also the anterior palatine foramina are very much larger in proportion. Other minor points might be noticed; but the above are abundantly sufficient to indicate the affinity of *H. striata* and *H. brunnea*, and their common distinction from the *crocuta*-group.

Having thus pointed out the more important particulars in which *H. striata* and *H. brunnea* agree, it remains to indicate those in which the difference between them is chiefly shown. So far as the general dimensions of the cranium are concerned, it may be said that, whilst the average length (extreme) of the cranium, measured from the incisive border in front to the point of the sagittal crest behind, appears to be greater in *H. brunnea* (1011 to 904)*, in regard to the zygomatic width the preponderance is greatly in favour of *H. brunnea*, in which this width is on the average 644—and in *H. striata* 590, in which species the maximum is 650, and minimum 510, whilst the corresponding numbers in *H. brunnea* are 680, 570. Another particular in which the two species differ is in the interorbital width, which is considerably greater in *H. brunnea* (206 to 181), the maximum and minimum being in *H. striata* 200 and 165, and in *H. brunnea* 215 and 190. The occipital condyles also, measured from outside to outside, show a width of 159 in *H. striata*, and of 200 in *H. brunnea*. In the height of the orbit the two species are pretty nearly alike, and both have it considerably less than *H. crocuta*. The nasals are smaller in *H. striata* than in *H. brunnea*, in which species those bones are larger even than in *H. crocuta*. Passing to the maxilla we find that the width measured from the outside of the 3rd premolars is in *H. striata* 308, and in *H. brunnea* 350 (the maximum in the former species being 335, and in the latter 380), whilst the least transverse measure of the upper jaw in *H. striata* is 198, and in *H. brunnea* 221, showing that in the latter case it is rather more constricted in front. Again, passing on to the teeth, the length of the upper incisor series in *H. striata* is on the average 127, and in *H. brunnea* 139; but when looking to the maximum and minimum in each case, it will be seen that no very great difference in this particular really exists. With respect to the length of the molar series, however, it is widely different; the mean figure for this in *H. striata* is 271, and in *H. brunnea* 312—the respective maxima being 285 and 320.

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* It should be stated, however, that these numbers are taken only from my own measurements, according to which the maximum length of the cranium in *H. striata* is 950, but that M. de Blainville gives the maximum for that species at 1070. But this difference may perhaps be due to the circumstance that he has included a specimen of *H. fusca* under that appellation.

As regards the individual teeth, those in which the greatest differences are perceptible are the 3rd incisor, the canine, the 3rd premolar, and the 4th premolar, the last two exhibiting considerably greater dimensions in *H. brunnea*.

In the mandible a corresponding want of size will be found in *H. striata*, the maximum length of the jaw, measured from the back of the condyle to the incisive border in front, being in that species 660, and in *H. brunnea* 740—the condyle in the former case measuring 145, and in the latter 170 in transverse diameter. And the other dimensions of the mandible are in agreement with these, as will be seen from the Table.

As to the teeth, the lower incisor series is of about the same length in both species; but the molar series, as a matter of course, corresponds with that of the upper jaw in its greater length in *H. brunnea* (309 to 268, or in the maximum, 320 to 288). The third incisors are about equal, but the canine is considerably larger in *H. brunnea*—the maximum size of that tooth in *H. striata* being

60×40, and in the other 75×50, equalling in fact the size of this tooth in *H. crocuta* *. All the other teeth are also considerably larger in *H. brunnea*; but the greatest differences are observable in the 2nd and 3rd premolars and in the molar. And with respect to the proportionate size of these teeth a remarkable distinction will be seen to exist. Whilst in *H. striata* the mean relative dimensions of the teeth stated in the above order, are 72×44, 78×43, and 81×40, the corresponding sizes in *H. brunnea* are 84×55, 94×53, and 94×50. These figures show not only that the three principal teeth in the molar series are a good deal smaller in *H. striata*, but also that in that species the last or molar tooth is larger than the penultimate, and that the other two are not very greatly different in size; whilst in *H. brunnea* the ultimate tooth is rather less than the penultimate, which, again, is a good deal bigger than the antepenultimate—differences in which it will be seen in the Tables that *H. brunnea* approaches *H. crocuta* and *H. spelæa*.

Having thus indicated the principal differences in dimensions between *H. striata* and *brunnea*, if we proceed to the differences in form, &c., of certain parts of the cranium and of some of the teeth, we shall find equally well-marked distinctions between the two species. Commencing with the cranium, it may be remarked that although in general form the brain-case does not differ very much, yet that it is on the whole more compressed in *H. brunnea*; and especially is this visible in the alisphenoid region, where, in both *H. crocuta* and *H. striata*, the sides of the cranium project abruptly, which is not the case in *H. brunnea*. A difference in the form of the occipital triangle will also be noticed. In *H. striata* as in *H. crocuta*, the lateral ridges by which it is bounded, or the superior occipital ridges, about an inch or an inch and a half below the point of the sagittal spine bend outwards, whilst in *H. brunnea* they descend to the mastoid almost in a continuous even line very slightly convex outwardly (figs. 4, 5); and they are also much more prominent in *H. striata*. The upper border of the sagittal crest is more arched in *H. brunnea*. In *H. striata* the nasals reach almost if not quite to the level of the highest point of the fronto-maxillary suture, whilst in *H. brunnea* they terminate nearly half an inch below it. The infraorbital foramen is larger in *H. brunnea* (0·55 to 0·45†). The width of the zygoma, as before remarked, is rather greater in *H. brunnea*; but the zygoma itself is much broader in the vertical direction, and at the same time more hollowed out on the inner aspect. The lower border of the orbit is thicker, and, as it were, more everted in *H. striata*. The auditory opening is larger in *H. brunnea*. The tympanic bulla is rather larger in proportion to the mastoid process in *H. striata*, but of much the same form, otherwise, as in *H. brunnea*; but the posterior vertical border or angle of the mastoid process, forming the continuation of the lateral occipital ridge, is concave or at any rate straight in *H. brunnea*, and convex in *H. striata*, in which species also the point of the mastoid process is much slenderer. The pterygoid gutter is much wider in *H. brunnea*. The form of the palato-maxillary suture is alike in both; and the length and breadth of the palatals are pretty nearly equal, but are rather wider, however, in the latter species.

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* *H. brunnea* is distinguished not only from *H. striata*, but also from *H. crocuta* and *H. spelæa*, by its having the lower canine larger than the upper.

† Probably commensurate with the greater size and abundance of the tactile vibrissæ in that species.

In *H. brunnea* the lower border of the horizontal ramus of the mandible is much more convex; the coronoid process longer and more reclined, arching backwards, in fact, beyond the condyle, whilst in *H. striata* it is greatly in front of it; and in *H. brunnea* the anterior border of the coronoid process on the outer surface projects into a high sharp ridge with a deep concavity behind it, which is altogether wanting in *H. striata*. The angular crochet is much broader and shorter and more upturned in *H. brunnea*. As has been before noticed, the mandibular condyle is much wider in *H. brunnea*. The dental foramen is small and rounded in *H. striata*, larger and elongated in a vertical direction in *H. brunnea*. The mandible generally is thicker or more robust in *H. brunnea*.

In the individual teeth we may remark that in the maxilla, besides the differences in dimensions which have already been adverted to, considerable differences in form will be apparent. The tubercle of the carnassial is larger and more rounded or bombé in *H. brunnea*. The anterior talons of the 2nd premolar and of the 3rd premolar are much more developed in *H. striata*. The canines and incisors are very much alike, except that the former are larger in *H. brunnea*, and the tubercular molars are indistinguishable. In the mandible the incisors are more in advance of the canines in *H. striata*. The anterior talons of the 2nd and 3rd premolars, as in the maxilla, are very much more distinctly developed in *H. striata*.

From what has been said, it will be apparent that the distinctions between the cranial and dental characters of *H. striata* and *H. brunnea* are in themselves sufficiently well marked to enable us, where the characters are ascertainable, readily to distinguish between these two species. The principal points, as it seems to me, to which attention should be directed, are:—

1. The form of the cranium.
2. The shape of the occipital triangle.
3. The width of the condyles.
4. The width of the pterygoid gutter.
5. The expansion and breadth of the zygomatic arch and of the zygoma.
6. The size and proportion and form of the teeth, and more especially of the upper and lower carnassials, and of the upper and lower 2nd and 3rd premolars and canines. The relative size of these two teeth and the proportionate degree of development of their anterior talons are of all characters the most striking and the most readily available.

(4.) With the objects I had in view in drawing up these observations, I have thought it unnecessary to indicate all the secondary points in which *H. brunnea* differs from *H. crocuta*. No one can have any difficulty in distinguishing them; and all the information I can afford, so far as comparative measurements are concerned, will be found in the Tables accompanying this paper. I shall therefore merely offer a few observations on the subject of the existence of two distinct forms of "Spotted Hyena," as evidenced in the cranial and dental characters. But before entering upon that subject I may be allowed to say a few words with respect to the opinions that have been published regarding the existence of two kinds of "Spotted Hyena."

Pennant, who was the first to lay down, in 1771, the generic distinction between *Canis* and *Hyæna*, was also the first clearly to describe a second species of the latter genus under the name of "Spotted Hyena," taking his description, as he says, from a living specimen which had been exhibited in London a few years before. In 1777 Erxleben*, though still arranging *Hyæna* under the Linnæan genus *Canis*, adopts Pennant's "Spotted Hyena" as a species, and translating his description into Latin, gives the species the name of *Canis crocuta*, citing as synonyms the "*Hyæna, sive congener illi Crocuta*," of Ludolphus, Æthiop. lib. i. c. 10, p. 50; and the Quambergo of Barbot, Guin. p. 86, and the Jackals or Boshund of Bossman, Travels in Guinea, p. 291, &c. Amongst the characters of this West African species, he gives "*cauda brevis, nigra, villosa.*" In a brief communication in Oken's "Isis" for 1828, p. 1144, Kaup observes that the common and the spotted Hyenas differ so widely that they may very properly be regarded as the types of two distinct genera, which bear the same relation to each other as do the Linnæan subgenera or (as he would himself regard them) genera of *Civetta* and *Genetta*. He instances among other particulars in which these genera may be said to present analogous characters, the presence in *Civetta* and the absence in *Genetta* of the anal follicle, as well as the possession by the former genus of an erectile mane, and of stripes, &c., in which it resembles the "Striped Hyena;" whilst the spotted fur of *Genetta* and the absence of an anal pouch and of a mane would point out the analogy between that genus and that of *Crocuta**. He consequently regards Pennant's genus Hyena as a family containing two genera *Hyæna* and *Crocuta*, with respect to the latter of which he says, "Two species can with certainty be referred to this genus, both of which must have lived in Europe. One species still lives in Africa, and this the *H. crocuta*." Under these two species of *Crocuta* it is obvious that Kaup included *H. spelæa* as the one which formerly inhabited Europe. And it is clear that he recognized only one species of the genus besides this.

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* Systema Regni animalis, &c. Lipsiæ, 1777, p. 575.

Cuvier† observes that there are two varieties pretty well marked, if not species, among the spotted Hyenas. "Some," he says, "are of a whitish grey approaching tawny, and have brown spots, round and well defined, on the flanks and thighs; those on the shoulder form a band which is continuous with a longitudinal brown line on each side of the neck; the feet are whitish, tinged with red towards the bottom; the tail is ringed with white and brown at the base, and blackish in its lower two-thirds; the head, of the same general colour as the back, presents a little brown towards the cheeks, and of red towards the vertex.

"Other spotted Hyenas have a denser coat, of a decided reddish grey; the underside of the neck and of the body, only, whitish; the blackish spots, which are ill defined, occupy the sides, the haunches, and the thighs, and a blackish band is also visible on each side of the neck; the legs and feet are blackish; but the inner side of the fore legs is reddish white; the tail is of a rusty brown colour for its first half, and blackish for the rest of its length. The head is reddish, blackish in front and between the the eyes; the lower part of the forehead rusty brown." "This variety," he says, "is common round the Cape."

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* Having lately examined a living *H. crocuta* in the Zoological Gardens, I can confirm Kaup's statement that no trace of a pouch between the root of the tail and the anus exists, at any rate in the male of that species.

† *L. c.* p. 319.

In a Paper under the title of "Tillägg om Slägtet Hyæna," or "Supplement respecting the genus *Hyæna*," which seems to have been intended as an Appendix to Thunberg's immediately preceding paper, in which *H. brunnea* is described, S. Ödmann enumerates four existing species of *Hyæna*, viz.:—

1. *Hyæna fasciata.*
2. *H. crocuta.*
3. *H. maculata.*
4. *H. brunnea.*

The distinctive characters he gives of *H. crocuta* and *H. maculata* are:—

1. *H. crocuta*, rufo-fusca, maculis triquetris vel oblongis, nigris, cauda elongata.

And the synonyms he assigns to it are:—

Crocuta (sive) "congener Hyænæ," Ludolphus, Hist. Æthiop. L. 1. cap. 10. § 51.

Canis crocuta, Schreber.

2. *H. maculata*, ferrugineo-fusca, maculis distinctis nigris, cauda brevi.

Syn. Pennant's "Spotted Hyena."

The Tiger Wolf of the Cape Colonists, &c.

The principal grounds adduced by Ödmann in favour of this distinction between the two forms of "Spotted Hyena" appear to be derived from the description given of it by Schreber*, who, at first having doubted whether Pennant's "Spotted Hyena" was more than a variety of *H. striata*, was afterwards satisfied of the contrary by the receipt of a drawing accompanied with a description taken from a living specimen of a "Spotted Hyena." But this drawing and description differed in the points above indicated from the figure and description given by Pennant; and as both are said to have been described and figured from nature, Ödmann conceived that it was impossible two such dissimilar animals should belong to the same species. I have not, however, as yet met with any zoologist who is acquainted with a long-tailed "Spotted Hyena;" and with respect to the shape of the spots and the varying tints of colour, these characters would not seem sufficient in the absence of more fixed ones to justify us in making two species out of *Hyæna crocuta.* And with reference to this I may state that there are at the present time four living Hyenas in the gardens of the Zoological

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* Säugethiere, T. iii. p. 374. tab. xcvi. B, *Canis crocuta.*

Society, viz.:—*H. striata*, *H. brunnea*, and two specimens of *H. crocuta*, one from South Africa, and the other, a more recent acquisition, from the west coast of Africa. I have attentively observed these two animals, which are both males, though doubtless of different ages, and am unable to perceive any difference between them, except in colour. The one from South Africa is generally much darker-coloured and browner, especially on the back and legs, and, owing perhaps to this universal darker hue, the spots are not so well defined as they are in his neighbour; and they appear to me to be rather smaller and less angular in outline than in the specimen from the West Coast. The hair also is somewhat longer, especially on the ears, in the South African form. But in the shape and size of the ears, and in general habit and stature, there is no difference whatever between the two animals. In both the tail is equally short, although the West African Hyena in this instance seems to have the habit of carrying his caudal appendage turned up. The animals are clearly of the same species.

There are no sufficient grounds, therefore, as it seems to me, at present for believing that Schreber's long-tailed Hyena was more than an instance of an individual peculiarity, even if its length of tail were not due merely to inadvertence on the part of the draughtsman. We have still therefore to seek for further evidence of a more decided nature to determine the question of the number of species or well-marked varieties of "Spotted Hyena." Having no other materials for the purpose, I have sought for this evidence in the cranium and teeth, with the results I am about briefly to detail.

I have already stated that the British Museum collection contains five crania belonging to the subgenus *Crocuta*. But of these, two, viz. nos. 1232*a* and 1232*b*, differ so widely at first sight from the others, and more especially from those numbered 822*a* and 822*b*, as even after considerable study to have led excellent observers to conclude that they belonged to distinct species. A third cranium, presenting exactly similar characters to nos. 1232 *a* and 1232 *b*, exists in the Hunterian Museum. It forms part of the skeleton of the *Hyæna crocuta* formerly in the possession of the late Dr. Buckland (No. 4446, R. C. S.).

For convenience I propose to denote these three crania as *H. crocuta*, A, and the other two as *H. crocuta*, B; and the comparative measurements of the two forms will be found in columns II. and V. of Table V. Inspection of the figures in these columns will show—1. that in the form A the length of the cranium is much less than in the other—that is to say, in the proportion of 993 to 1090; 2. that the zygomatic width is also less, in the proportion of 703 to 715; and in fact that all the other cranial measurements are less, except the interorbital width, which in form A exceeds that of the other in the proportion of 240 to 225. In the maxilla we find a very remarkable difference in the length of the palate, which in the form A is represented by 470, whilst in B it amounts to 550, and that the length of the palatals is in the former case 199, and in the latter 240*. These figures show that the length of the upper jaw is considerably greater in form B; but when we come to the width, the same difference does not obtain, the transverse diameter of the maxilla, both at the 1st premolar and at the 3rd premolar, being exactly the same in both cases. And the same thing is apparent in the dimensions of the incisor and of the molar series—the former being absolutely wider in A, in the proportion of 165 to 150, whilst the latter series of teeth measures in it only 310, and in B 335. We perceive therefore that the maxilla in form A is, as compared with the other, disproportionately short and wide. On comparing the individual teeth, even more important differences in dimensions are found to exist. The 3rd incisor, notwithstanding the greater length of the incisor series, is considerably smaller in form A than the corresponding tooth in the other form, or in the proportion of 46 × 35 to 60 × 40. The same disproportion is found in the canine, and in even a still greater ratio in the remaining teeth, and especially in the 3rd and 4th premolars. In the 3rd premolar the difference may be expressed by the figures 71 × 60 and 100 × 70, and in the 4th premolar by 130 × 44 and 150 × 85.

Corresponding differences, as may be supposed, exist in the mandible and its teeth. The only dimensions in which the lower jaw in the form A exceeds the other are its height under the molar, expressed by the figures 174 and 170, its width at the 2nd premolar (302 and 300), and the length of the incisor series (125 and 120). We see therefore in this jaw as well as in the maxilla a disproportionate width in comparison to its other dimensions, as will be more clearly seen on reference to the Table. The much smaller dimensions of the teeth are even more strongly marked in the mandibular than in the maxillary teeth; as an instance, I would notice the comparative numbers standing opposite the molar, viz. 106 × 46 and 120 × 52.

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* But there is reason to believe that the length in this case is exceptional.

The above statement, together with the figures given in the Table, is sufficient to show that there is every excuse to be made for those who upon comparison of the two crania 1232*a* and 1232*b* in the British Museum with those of the B form, numbered 822*a* and 822*b*, should have regarded them as specifically distinct. But the two latter specimens might be exceptional, and it was necessary to compare them with others bearing the same general type, but of less dimensions and of younger age. Fortunately means for doing this existed in the crania No. 4447 of the Royal College of Surgeons and No. 37783 in the British Museum. The latter, as will be seen in Table IV., is of small dimensions; but the mean of these two crania, though generally less than in 822*a* and 822 *b*, is yet greatly in excess of No. 1232*a* and 1232*b* &c. The chief exceptions to this rule are, the zygomatic width, which in the form A is 703, and in the others 660; the aural width, 385 and 370; and the interorbital width, 240 and 225; the transverse diameter of the maxilla at the 3rd premolar, 410 and 390, and at the 1st premolar, 260 and 242; and the length of the incisor series, 165 and 151. In the mandible the long diameter of the condyle is rather greater in form A, and the depth under the molar considerably greater. The diasteme also is somewhat longer. But in the size of the individual teeth the preponderance is almost equally great against form A as we found it to be in the case of form B. In a cast of the mandible of *H. crocuta* in the possession of M. Lartet, taken from a specimen belonging to M. Verreaux, of Paris, I took the measure of the lower molar series, and found the numbers opposite each tooth to correspond pretty nearly, though all are somewhat bigger, with those of form B.

Having thus gone over the principal numerical differences between the various forms referred to *H. crocuta*, I would offer a few remarks on the other differences observable between them.

1. In both the crania of the form B, the infraorbitary foramina are more compressed than in form A, in which these openings are larger and rounder. 2. A very remarkable difference exists in the much greater size of the tympanic bullæ in form B, in which they are rounded and inflated, and tolerably even on the lower surface, which extends downwards rather below the level of the point of the mastoid process. The same size and form exists in the cranium No. 4447 of the Royal College of Surgeons; but in No. 37783 of the British Museum, a beautiful specimen of a Wild Hyena from Natal, these bullæ are very

much less inflated, and are angular on the under surface. In all three specimens of form A the bullæ are very flat and angular. 3. In all the three instances comprehended under form A the upper tubercular molar is either entirely wanting without leaving even the trace of an alveolus, or is extremely minute; whilst in form B it has the dimensions given in the Table, and where it is wanting it has left a distinct and well-formed biradicular alveolus. Secondly, the digital fossa at the root of the upper carnassial is much shallower in the form A. The palato-maxillary suture in form A is rounded in front, and does not extend forwards beyond the level of the 4th premolar, whilst in 822*b* it forms an acute angle in front and reaches to nearly the middle of the 3rd premolar. In 822*a* this part of the palate is wanting. But in the crania No. 4447, Royal College of Surgeons, and No. 37783, British Museum, this suture is rounded as in form A; whilst again in M. Lartet's cast above referred to it is angular in front; so that I am in doubt as to the value to be placed on the form of this suture as a diagnostic mark, and merely record the facts for future consideration. With respect to the individual teeth, little can be said, on account of the very imperfect state in which the majority of them exist in the three A crania. I may observe, however, that, besides its far smaller size, the 4th premolar is remarkable, in form A, for the proportionately small size of its anterior cusp, which is merely represented by a rounded tubercle, which is so much lower than the others as to be almost untouched by wear, although the latter are much worn. And the internal tubercle is also much smaller and more rounded. I will here add what I find in Dr. Falconer's notes respecting his comparison between 1232*a* and 1232*b* and 822*a* and 822*b*. Regarding the latter as *H. brunnea*, he says of it:—

(*a*) The cranium is proportionally longer and higher.

(*b*) The cerebral case is less inflated and more compressed upwards.

(*c*) The sagittal crest is longer, much higher and more pronounced, and it projects further backwards beyond the condyles.

(*d*) The auditory bullæ are much more inflated.

(*e*) The facial portion is more elongated and less strangled.

(*f*) The infraorbital region is higher, more convex and narrower.

(*g*) The lower rim of the orbit is broader and more lip-like in *H. striata*. With respect to the mandible he remarks:—

(*a*) The horizontal ramus is less suddenly turned upwards behind.

(*b*) The form of the coronoid process more resembles that of *H. striata*, but its anterior edge is more reclinate than in that species.

Now, are the differences between the two forms A and B sufficient to determine their specific distinction? and if not, how are such apparently important differences to be accounted for?

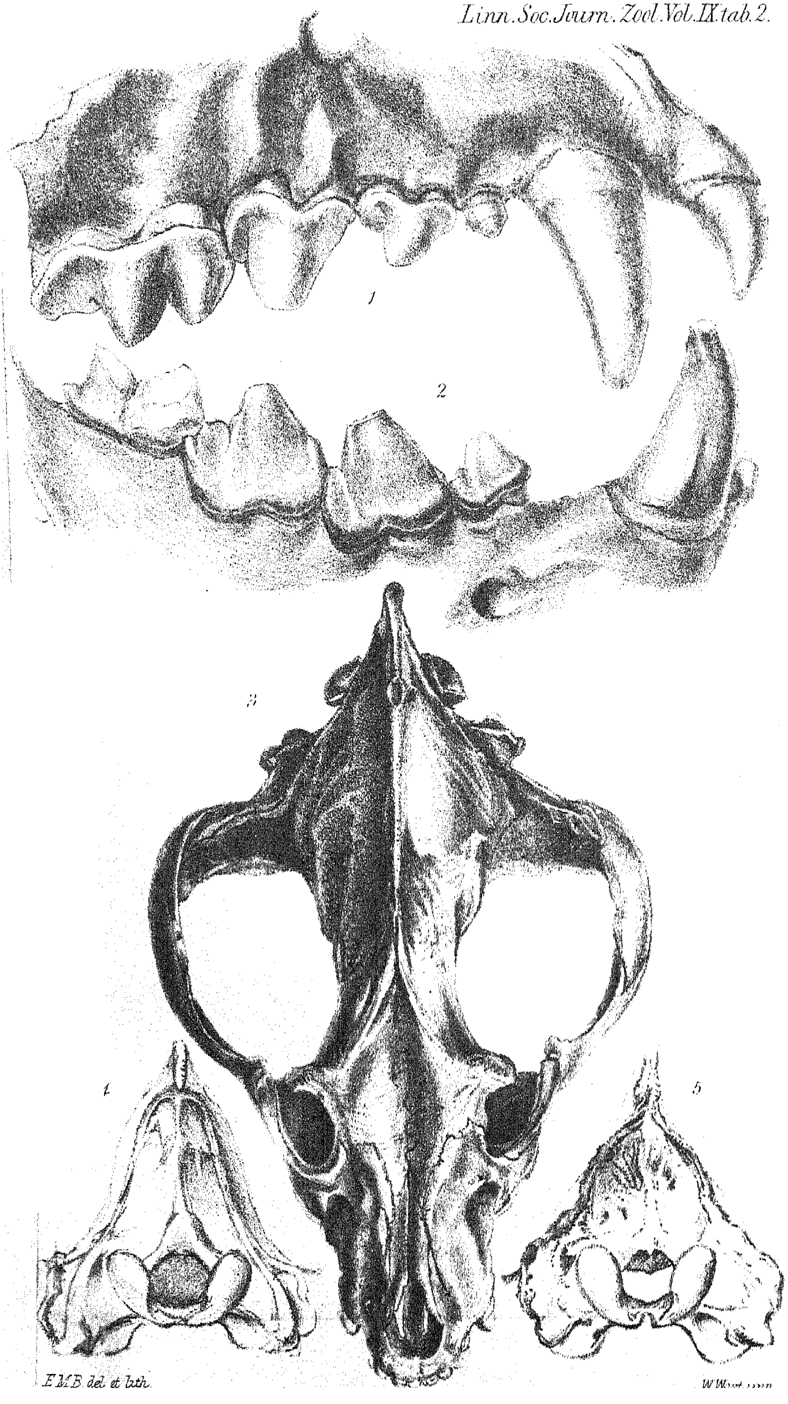
I am inclined to think that the former part of this question should be answered in the negative, and that a tolerably satisfactory reply can be made to the second.

The first thing that strikes one is, that the three animals which have been taken as types of form A have all died after long confinement in menageries, into which they were probably brought when young, and, it may be, before the second dentition was completed. In all three the teeth, as a dentist would observe, are in a "shocking state," and in fact the greater part of them are either entirely wanting or in such a condition as to have been nearly unserviceable. It is quite impossible that animals in this condition could have maintained themselves in the wild state. Accompanying this condition of the teeth, the jaws will be found to present considerable evidences of morbid action, having the texture of the bone porous, and in fact in a state of interstitial atrophy; and their softened or yielding consistence may be seen, more especially in Dr. Buckland's specimen, in the abrupt expansion of the alveoli on each side of the mandible and, in less degree, of the maxilla. We can thus account for the comparatively greater width of the jaws. In like manner I think all the other differences, including even that which is observed so remarkably in the size of the tympanic bullæ, but more certainly in the degree of development of the sagittal crest and other processes for muscular attachments, may be attributed to the unnatural mode of life, and perhaps also in some degree to the preternaturally prolonged existence of the caged animals. The most difficult point to get over, as it seems to me, is the absolutely smaller size of the individual teeth. We cannot of course suppose that these would diminish in size (except by wear) after they were once fully extruded; and the only explanation I can offer of this circumstance is, that the animals may have been brought into confinement at an early age, and that the permanent teeth had become in some measure interrupted in their development, in consequence of the altered conditions in which they were placed. These considerations will at any rate serve to show how dangerous it is to rely upon conclusions drawn from the study of animals that have long lived in an unnatural condition—a necessity which, as observed by M. de Blainville, has heretofore thrown great difficulties and, as we have reason to believe, considerable confusion upon the subject of specific distinctions in the Hyenas.

But the same observations apply with equal force to every part of the skeleton; and, speaking in the name of palæontology, it is deeply to be regretted that there are at the present time no means whatever of studying the osteology of either *Hyæna crocuta* or *Hyæna brunnea* in the wild state; and I am not even sure that any skeleton of a really wild *H. striata* is to be found in either the British Museum or the Hunterian Museum. Fortunately we have now sufficient means of studying the cranial and dental characters of the three living species; but palæontologists want more than this, and it is much to be hoped that no endeavours will be spared to procure complete skeletons also of each species in the wild state.

Explanation of Tables.

In the first four following Tables I have collected the various cranial and dental measurements which have appeared most suited to show the peculiarities, so far as dimensions are concerned, of the different species and varieties of *Hyæna.* At the bottom of these Tables the numbers relating to each particular are reduced to a mean; and in Table V. these means are placed in parallel columns, so that the differences between the different forms in each item will be seen at a glance. And in the same Table are also given the maximum and minimum measures of each part as observed by myself. Except perhaps in the case of *H. striata*, the number of instances upon which the mean dimensions are founded are not sufficient to afford perfectly reliable data; but they are sufficient for my immediate purpose, of showing, 1st, the distinctive characters between *H. striata* and *H. brunnea*, and, 2nd, the extreme diversities observable more especially between the wild and the caged specimens of *H. crocuta.* I have added a few measurements of *H. spelæa*, more to show how such results as have been obtained may be applied in the comparison of the fossil forms *inter se* and with the existing species than with any intention of including that species in the present inquiry. But I may remark that the comparison of the absolute and relative sizes of the various teeth in both jaws of *H. crocuta* (*fera*) and *H. spelæa*, though showing generally an advantage in favour of



E.M.B. del. et lith.

W. West imp.

the cave-Hyena, especially as regards the upper and lower carnassials, and in the 1st premolar, is quite confirmatory of the opinion that they are but varieties of one and the same species. But the proper comparison of the other bones of the skeleton yet remains to be made before this opinion can be regarded as fully established.

A few words are requisite in order to explain why so many columns are devoted in Table V. to *H. crocuta.*

Column I. shows the mean dimensions deduced from every specimen of *H. crocuta* that has come under my observation, taken together; and it is given in order to afford, as nearly as the amount of materials would allow, the mean of all the variations to which that species is subject.

In Column II. the figures show, as I have explained in the latter part of the paper, what I take to be the important changes induced in this species of *Hyæna* in consequence of its unnaturally prolonged existence in a state of captivity from an early period of life; and in Column III. these amounts are contrasted with those taken from the mean dimensions in all the specimens of *H. crocuta* living in a state of nature, and embracing individuals considerably differing in size, though not, as will be observed, varying from the general mean of the species in all the more fixed and important points.

In Columns IV. and V. are contrasted the extremes observed by me in what would appear to be varieties (perhaps in some cases sexual?) of the wild Hyena. And I have done this also with the view of comparing, at some future time, this diversity in the existing *H. crocuta* with the even still greater diversities exhibited in its fossil representative.

N.B.—The numbers are all given in $\frac{1}{100}$ths of an inch, and they, of course, are readily reduced to millimetres by multiplying them by 25·4 and dividing by 100. Those numbers to which an asterisk is added have been taken from only a single specimen in each instance.

DESCRIPTION OF PLATE.

Fig. 1.—Maxillary teeth of *H. brunnea.*
Fig. 2.—Mandibular teeth of *H. brunnea.*
Fig. 3.—Vertical view of cranium of *H. brunnea* (half size).
Fig. 4.—Occipital triangle of *H. brunnea* (half size).
Fig. 5.—Occipital triangle of *H. striata* (half size).

On the Longicornia of Australia, with a List of all the Described Species, &c. By Francis P. Pascoe, F.L.S., F.Z.S., &c., late Pres. Ent. Soc.

[Read June 21, 1866.]

A list of Australian Longicornia which I published about seven years ago, contained the names of 259 species. Through the kindness of many friends this number has now been brought up to nearly 500; but if we take into consideration the economy of these insects, their usually short lives in the perfect state, and their attachment to certain trees in which their larvæ have fed, confining their distribution in many cases to very narrow limits, we can scarcely avoid drawing the conclusion that we are still very far from having a complete list. However, it is I think desirable, in the dispersed condition of zoological literature, that we should now and then examine the materials that have been accumulated, and indicate where they are to be found; and this I have attempted to do in the following pages.

The boundaries of these austral lands, viewed as a zoological region solely in relation to the Coleoptera, seem to be strictly limited to Australia and Tasmania,—New Guinea, to the north, belonging to the Malay region, and very decidedly separated by Torres Straits; while New Caledonia and New Zealand, to the east, can be regarded as satellite regions only—that is, as containing a mixture of no very decidedly characteristic geographical genera with a few others strictly endemic and often of very remarkable structure.

If we take the Coleoptera as an order, then the Longicornia may be regarded as a suborder composed of the three families of *Lamiidæ*, *Cerambycidæ*, and *Prionidæ*. Each of these is divided into numerous subfamilies, from which we pass to the genera and species.

The Longicornia offer many difficulties in their classification. Many of the technical characters used for defining the genera do not amount to more than modifications, sometimes with almost insensible gradations between them; but genera, like species, are often differentiated by very slight characters only, and what is true of one is as true of the other. It is not, however, to be inferred that the genera themselves are in such cases so insensibly connected; it is the characters by which we attempt to indicate them. Occasionally, too, we find the generic characters merging into the specific; and yet the genus, in the sense of a group of nearly connected species, is not thereby by any means invalidated. To meet the objections to such groups, it is sometimes proposed to call them "subgenera;" but the idea of overcoming such a difficulty by the alteration of a name seems to me to be a mere delusion. Well-defined genera require aberrant species to be eliminated; if the genera are to be enlarged to meet such cases, then the genera, as such, cease to have any definable limits, and can convey no certain idea to the mind. Having acted on the principle of the first proposition, it has appeared to me desirable to make these remarks in order to meet the objection of those who consider, not that the number of genera should be regulated by their practical utility, but that it should be limited so as to avoid the inconvenience of taxing the memory. It is, I think, a great point gained when the knowledge of one member of a genus enables us, with the aid of a short diagnosis, to form a good idea of another; and this can only be done by a careful avoidance of mixing incongruous species together into one genus. For this, many new genera will have to be propounded; and this practice appears unquestionably to be becoming more and more the tendency of modern systematists. It may, however, be carried too far, as when nearly allied species are separated solely on technical grounds—such separatists failing to see that what may be good generic characters in one case are only of specific importance in another.

In order to make this list as complete as possible, I have prefixed descriptions of the following new species. Some of them and a few other interesting forms, not hitherto figured, are represented in the two plates appended to this Catalogue.

HEBESECIS SPARSA.

H. nigra; antennis annulatis; scapo modice elongato; prothorace supra glabro, utrinque niveo pubescente; elytris ovatis, bicarinatis, maculis niveis pubescentibus dispersis.

Hab. Western Australia.

Black; head broad in front, with little tufts of white hairs: antennæ rather larger than the body; the scape subelongate, obconic; the third and fourth joints, at the base, and the sixth and eighth, white; prothorax glabrous above, closely punctured, the sides covered with a dense snowy-white pubescence; scutellum small, rounded posteriorly: elytra ovate, rather coarsely punctured, covered with small white tufts of pubescence, each elytron with two rather strongly marked carinæ: body beneath with a tufted whitish pubescence; legs slightly pubescent. Length 4–7 lines.

This species has long stood in our collections as *Hebecerus sparsus*, Reiche, a name, I believe, never published. It is related to *H. Germari*, but, *inter alia*, it has a longer scape, and the prothorax has not the white stripe at the side.

NEISSA.

Caput antice transversum, tuberibus antenniferis brevibus. *Oculi* late emarginati. *Antennæ* sparse pilosæ, corpore longiores; *scapo* modice elongato, apicem versus sensim crassiore, articulo tertio quam scapus paulo breviore, quarto præcedenti æquali, cæteris gradatim decrescentibus. *Prothorax* capite vix latior, quadratus, utrinque abrupte spinosus. *Elytra* oblonga, basi cristata, lateraliter deflexa, apice integra. *Pedes* subbreves, æquales. *Pro-* et *mesosterna* simplicia.

A small species, resembling *Pentacosmia scoparia* in habit and colour, is the type of this genus. From *Pentacosmia*, however, it differs in its quadrate prothorax, basal crests of the elytra, antennæ with the third joint not longer than the scape, the fourth equal to the preceding, and the remainder gradually diminishing in length. *Illæna*, Er., is probably nearly allied to this genus; but he describes the prothorax as only slightly nodose at the sides. The other characters given by Erichson are very general; but he compares it to *Anæsthetis* and *Deroplia* (*Stenidea*). Of the second species I have seen only a single example. Both species I owe to Mr. Odewahn.

NEISSA INCONSPICUA.

N. fusca, sparse albo pilosa; elytris obscure pallido variis.

Hab. South Australia (Gawler).

Brown, clothed with more or less erect whitish hairs; the elytra faintly marked with indistinct palish patches; head and prothorax closely punctured, the lateral spine of the latter very slender even at the base; scutellum triangular; elytra subseriate-punctate, obliquely depressed outside the basal crest, the side abruptly bent down, the angle there formed not prominent, towards the apex a short, slightly elevated line; body beneath, legs, and antennæ rufous brown, sparingly pilose. Length 2 lines.

NEISSA NIGRINA.

N. subdepressa, nigra, pube brevi concolore et pilis dispersis albidis tecta; antennis scapo, articulis tertio et quarto longioribus.

Hab. South Australia (Gawler).

In most of its characters closely agreeing with the preceding, but in size and colour apparently very distinct; the pubescence is also shorter, and, to the naked eye, is nearly uniformly black; the scape and third and fourth joints of the antennæ are relatively longer, and the legs are proportionally larger; above, all the body and especially the elytra are decidedly depressed. Length 3½ lines.

BUCYNTHIA.

Caput antice quadratum. *Oculi* parvi, remoti. *Antennæ* graciles, fimbriatæ, basi distantes; scapo modice elongato, apice subproducto, obsolete cicatricoso; articulo tertio multo longiore, sequentibus gradatim brevioribus. *Prothorax* transversus, lateribus minute dentatus. *Elytra* subdepressa, ovata, prothorace valde latiora. *Pedes* mediocres, fere æquales: *tarsi* parvi. *Prosternum* simplex. *Mesosternum* elevatum, antice subdentatum.

The only species constituting this genus was originally referred by me to *Zygocera*, with some of whose members, as the genus then stood, it has a considerable resemblance in form and colour. The widely separated antennæ at the base, however, show that it should be referred to the *Mesosinæ* rather than to the *Hypselominæ*, to which I consider *Zygocera* belongs. The type is *Bucynthia spiloptera*, Pasc. (*Zygocera*).

SYMPHYLETES DEVOTUS.

S. subangustus, ferrugineus, pube brevi, densa, subsericea tectus; prothorace subtransverso, antice paulo constricto, ad latera irregulariter rotundato, disco tuberculis quatuor parvis instructo; elytris subparallelis, apice subtruncatis, basi leviter tuberculato-cristatis, pone medium plaga irregulari obliqua alba; tibiis quam tarsi brevioribus.

Hab. Western Australia (Perth) (*Mr. Duboulay*).

Rather narrow, ferruginous, covered with a short, dense, somewhat silky, greyish pile; head rather narrow in front, median line glossy black and very distinct; prothorax subtransverse, a little narrower anteriorly, the sides irregularly rounded, the disk with two transverse tubercles, behind these two others not quite so prominent; scutellum scutiform; elytra subparallel at the sides, the base broader, with two or three black shining tubercles on each, the apex rounded, behind the shoulder, at the side, a pale patch, which is nearly connected with a broad oblique irregular band behind the middle; body beneath with a long, greyish, silky pile; legs and antennæ closely pubescent, greyish, tinged with brownish yellow. Length 9 lines.

The pubescence is more silky than is usually met with in this genus; the species is otherwise very distinct, although, from its general appearance, it may be placed with *S. munitus*, *S. sodalis*, *S. ingestus*, and others.

SYMPHYLETES DUBOULAYI.

S. cylindricus, pube cinerea maculis numerosis fulvis adspersa tectus; prothorace cylindrico; elytris parallelis, basi haud cristatis, apice rotundatis, granulis nigris nitidis numerosis instructis, ad latera plaga oblonga nivea ornatis.

Hab. Western Australia (Perth) (*Mr. Duboulay*).

Cylindrical, ferruginous, covered with a close short ashy pile spotted with fulvous; head rather broad and flattish in front, the pubescence ochraceous, especially round the eye, the median line black and well marked; prothorax cylindrical, with transverse interrupted lines of fulvous; scutellum rather large, subscutiform; elytra elongate, with nearly parallel sides, the apex rounded, a few black granules at the base, and several smaller ones along the suture, but more ferruginous, a snowy oblong patch on the external margin, the rest of the elytra with numerous small fulvous spots on an ashy ground; body beneath with a long ashy pubescence; the edges of the abdominal segments and spots on the sides of the sterna fulvous; legs with a whitish pubescence, spotted and clouded with fulvous; antennæ ferruginous, slightly pubescent, spotted with white. Length 9 lines.

A very distinct species, with longer and more parallel elytra than any other that I am acquainted with, and remarkable for the uniform distribution of its colours, with the exception of the snowy patch along the side.

SYMPHYLETES SUBMINIATUS.

S. ferrugineus, rufescente varius; elytris subtrigonatis, basi spinuliferis, apice truncatis, margine exteriore apiculatis.

Hab. Western Australia (Perth) (*Mr. Duboulay*).

Ferruginous, with a sparse greyish pile varied with patches of rufous or reddish orange, short, closely set hairs; head orange in front, and thinly punctured, the vertex ferruginous; prothorax slightly transverse, subquadrate, the sides very slightly rounded, the disk with two small central tubercles, sparsely punctured, ferruginous in the centre, orange at the sides; scutellum transversely scutiform; elytra subtrigonate, rather finely punctured, with orange patches at the base, along the suture, and on the sides, the base with a few small triangular spines, the apex truncate, its exterior margin on each side produced into a close mucro; body beneath along the middle and the abdomen covered with long ashy hairs; the breast at the sides orange; legs ferruginous, tibiæ scarcely as long as their tarsi; antennæ ferruginous, varied with a pale pile. Length 7 lines.

This very distinct species may, for the present, stand after *S. fulvescens*, Pasc.

SYMPHYLETES ILIACUS.

S. subangustus, viridi-olivaceus, plus minusve denudatus; elytris basi granuliferis, apice truncatis, ad latera niveis.

Hab. Western Australia (Champion Bay) (*Mr. Duboulay*).

Rather narrow, dark olive-green, shining and for the most part without any or with very little pubescence; head with a white pubescence, principally about the eyes, and with a few long white hairs; prothorax oblong, nearly cylindrical, rugose, with widely scattered hairs, the disk with two slight tubercles; scutellum scutiform; elytra narrowly subtrigonate, with a few large, mostly conical, granules at the base, the apex truncate, the disk more coarsely punctured at the base, where also is a sparse greyish pile, a densely pubescent snowy patch from the shoulder, gradually lessening towards the apex; body beneath and legs with a sparse whitish pile; fore tibiæ curved, middle and posterior rather shorter than their tarsi; antennæ with a thin whitish pubescence, and clothed with long hairs beneath. Length 6 lines.

Also a very distinct species, which may stand after *S. variolosus*, Pasc.

SYMPHYLETES SIMIUS.

S. ferrugineus, nitidus, fere denudatus; elytris subtrigonatis, basi spinuliferis, apice truncatis, ad latera antice plaga pubescenti-fulva.

Hab. Western Australia (Champion Bay) (*Mr. Duboulay*).

Ferruginous, shining; head rather strongly punctured in front, the median line not reaching to the mouth; prothorax nearly subquadrate, irregularly punctured, with two tubercles on the disk; scutellum subscutiform, rounded posteriorly; elytra subtrigonate, rather closely punctured, with a few scattered concolorous granules, one or two spiniform, at the base, the apex truncate, an oblong orange patch at the side near the shoulder; body beneath with a long whitish pubescence; the breast orange at the sides; legs with a few scant whitish hairs, more numerous at the tips of the tibiæ; antennæ nearly naked, a few whitish hairs fringing the lower edge. Length 7 lines.

Near *S. egenus*, but with truncate elytra like *S. derasus*, without, however, the snowy stripe on the side.

SYMPHYLETES BATHURSTII.

S. ferrugineus, pube tenuissima grisea tectus; prothorace oblongo, subcylindrico; elytris subtrigonatis, modice punctatis, basi leviter granuliferis, apice truncatis, margine exteriore dense niveo pubescente.

Hab. South Australia (Gawler) (*Mr. Bathurst*).

Ferruginous, with a thin scaly greyish pubescence, and minute patches of fulvous; head with a close whitish pubescence in front, and three fulvous stripes on the vertex; prothorax oblong, nearly cylindrical, the disk with two small central tubercles; scutellum rather transverse, depressed in the middle; elytra subtrigonate, rather thinly punctured, a few concolorous granules principally at the base, the apex truncate, a white densely pubescent band along the side externally; body beneath with a long greyish (on the abdomen yellowish) pile; legs and antennæ with a greyish pile; the latter fimbriated beneath. Length 8 lines.

Differs from *S. derasus* chiefly in pubescence; there are also a few minor differences, such as the broader head, more convex in front and much less depressed between the antennæ, the longer prothorax, &c. A good series of specimens might show that they belong to one species.

RHYTIPHORA ODEWAHNII.

R. nigra, pube opaca interrupta flavescente tecta; elytris conferte flavescente maculatis, apice truncatis; antennis albo annulatis.

Hab. South Australia (Gawler).

Black; pubescence opake, pale yellowish, interrupted; head with two pubescent stripes on the occiput, a vertical stripe behind the eye, the face with irregular patches; prothorax very short, having four or five narrow bands; scutellum semicircular; elytra not granulate at the base, covered with closely set pubescent spots (often confluent) of pale yellowish, the intervals very slightly pubescent, showing the black derm beneath; body beneath with a whitish pubescence, spotted with brown; legs closely pubescent; antennæ black, the basal half from the third to the tenth joints ashy white. Length 9 lines.

A very distinct species, and at once differentiated by the closely set spotted pubescence on the elytra. I have dedicated it to Mr. Odewahn, from whom my example was derived.

RHYTIPHORA SEMIVESTITA.

R. castanea, subtiliter pubescens; prothorace fasciis angustatis, elytris maculis indistinctis ochraceis ornatis, his postice plagis duabus glabris; antennis griseo maculatis.

Hab. Western Australia (Perth).

Chestnut-brown; pubescence very thin, greyish, with linear bands on the prothorax and spots on the elytra ochraceous; head and basal joint of the antennæ nearly glabrous; prothorax transverse; elytra with numerous granules, extending to behind the middle, and of the same colour as the derm, posteriorly on each side a large glabrous patch; rest of the elytra with a mixture of pale greyish and small ochraceous spots; body beneath and legs reddish chestnut, nearly glabrous, except a few spots on the sides, borders of the abdominal segments, and lower part of the tibiæ and tarsi; antennæ slightly pubescent, except at the base, spotted with greyish. Length 12 lines.

Also very distinct.

MICROTRAGUS STICTICUS.

M. cinereo pubescens, omnino nigro setulosus; prothorace rude punctato; elytris angustatis, maculis nigris elevatis dispersis.

Hab. ——.

Pubescence pale ashy, very dense and short; in other respects resembling *M. arachne*, but the prothorax less rugosely punctured, and the black spots on the elytra composed of stiff erect hairs, more decidedly raised above the surrounding pubescence. Additional specimens may probably show that this is only a variety; but the difference in colour is very marked. Length 7 lines.

ATHEMISTUS ARMITAGEI.

A. brunneus, tenuiter griseo pubescens; prothorace antice angustiore, lateraliter dente minuto instructo, disco haud tuberculato; elytris elliptico-ovatis, in medio quam prothorax latioribus.

Hab. Sydney.

Reddish brown, with a very fine greyish pubescence; head thinly punctured, a little convex in front; prothorax broader than the head, very sparsely but rather more coarsely punctured, narrowed anteriorly, rounded at the sides, and behind the middle furnished with a very small but distinct tooth; scutellum triangular, very indistinct; elytra scarcely broader than the prothorax at the base, gradually increasing to the middle, then more rapidly rounded to the apex, the disk with very closely arranged rows of small tubercles, which towards the apex are replaced by large deeply impressed punctures, the apex of each elytron rounded; antennæ, body beneath, and legs brown, thinly pubescent; tibiæ with yellowish hairs at the tip; antennæ rather more than half the length of the body. Length 3½ lines.

Smaller and stouter than *A. rugosulus*, Guér., and well distinguished by the characters of the prothorax, elytra, &c. I have named it after Edward Armitage, Esq., A.R.A., who kindly presented me this and the following species, although uniques in his collection.

ATHEMISTUS FUNEREUS.

A. ater, obsolete pubescens; prothorace antice paulo angustiore, lateraliter dente minuto instructo; elytris oblongo-ovatis, quam prothorax vix latioribus.

Hab. Sydney.

Black, with only very faint traces of pubescence; head finely punctured; prothorax broader than the head, coarsely and rather closely punctured, somewhat narrower anteriorly, rounded at the sides, with a very small but distinct tooth; scutellum very small and indistinct; elytra oblong-ovate, scarcely broader than the prothorax in any part, slightly rounded at the sides, the apex of each rounded, the disk with very closely arranged rows of small tubercles; antennæ, body beneath, and legs reddish brown; the tips of the tibiæ with yellowish hairs; antennæ about two-thirds the length of the body. Length 3½ lines.

Distinguished from the last by its larger and more coarsely punctured prothorax, narrower and more parallel elytra, and its black colour, with an almost obsolete pubescence.

HATHLIODES.

Mycerino affinis sed differt præcipue *prosterno* simplici, haud antice producto.

In *Mycerinus dorcadioides*, Serv., the prosternum is raised, produced, and transversely expanded in front, and, the propectus being reduced to a mere line, the head, or rather the under surface of the oral organs, rests against it. To this genus, which originally received the name of *Hathlia* from Dejean, but which was first described by M. J. Thomson*, several species have been referred by Hope, Blanchard, Guérin, and myself; they all differ, however, in the very important structural character mentioned above, and they also differ considerably among themselves. With the exception of one species, which will be referred to presently, I propose, notwithstanding, to retain all the Australian species in this genus. Nevertheless it might have been thought desirable to distinguish between those species with a fusiform outline, like *Hathliodes grammicus*, and those with the humeral angles of the elytra projecting beyond the base of the prothorax, like *H. quadrimaculatus*; but then this character not only varies in degree in the species, but it also varies to a certain extent in individuals, as in *H. aridus*. M. J. Thomson formed his genus *Mycerinopsis* on the latter, chiefly on account of its longer antennæ; but its affinity to *H. quadrilineatus*†, Hope, is, I think, too close to allow of its separation. *H. lineellus* is a somewhat degraded form of the genus; while *Hathlia gracilis* and *H. procera*, the latter a Ceylon species, are altogether aberrant‡. The following species, which has not been described hitherto, is allied to *H. grammicus*; both are in the collection of the British Museum, and were received from an officer of a surveying-ship, but without any precise locality; they are supposed to be from the north or north-west coast.

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* This is not quite correct, M. Guérin-Méneville having pointed out in his 'Iconographie' (p. 428), but in an irregular sort of way, the characters which distinguish *Hathlia* (or *Hatlia*, as it was there spelt) from *Apomecyna*, to which it had been united by Serville.

† This is a variable species, black to greyish ochreous, with pale or whitish lines, some of which are occasionally obsolete.

‡ *Hathlia Buckleyi*, Pasc. (Trans. Ent. Soc. ser. 2. iv. p. 107), I propose to separate from all the above; its genus I may briefly characterize here:—

MARMYLARIS.

Caput magnum. *Antennæ* corpore paulo longiores, articulo quarto tertio fere æquali, cæteris brevioribus. *Prothorax* capite haud latior, transversus, cylindricus. *Elytra* valde convexa, parallela, prothorace vix latiora. *Pedes* validi. *Pro-* et *mesosterna* ut in *Lychrosi*.

A narrower and more convex form than any of the preceding, with larger head, &c. *M. Buckleyi* is a peculiar species, white, the elytra covered with numerous very distinct black spots; it is from India. M. J. Thomson's *Mycerinus varipennis* appears to be referable to this species.

HATHLIODES MORATUS.

H. supra pallide griseo pubescens, lateribus albidis; elytris basi prothorace vix latioribus, oblique striatis, postice dehiscentibus, apice singulorum angulato.

Hab. North coast?

Densely pubescent, pale greyish above, whiter at the sides, irregularly punctured; head nearly as broad as the prothorax; the latter rather longer than broad; the elytra at the base scarcely broader than the prothorax, obliquely striated, dehiscent posteriorly, each apex ending in a somewhat acute angle; body beneath, legs, and antennæ covered with a dense whitish pubescence. Length 6½ lines.

LYCHROSIS.

Caput antice paulo rotundatum. *Oculi* parvi. *Antennæ* basi remotæ, corpore breviores, scapo subelongato, cylindrico, articulo tertio multo longiore, quarto præcedente breviore, sequentibus multo brevioribus. *Mandibulæ* validæ. *Prothorax* lateribus rotundatus. *Elytra* convexa, subcylindrica. *Pedes* æquales. *Coxæ* anticæ magnæ, eductæ. *Prosternum* haud productum, antice angustius.

The type of this genus (*Mycerinus luctuosus*) appears to me to be so distinct in habit as to make it desirable to separate it from the other species, notwithstanding the differences which prevail among them. The most obvious peculiarities of the genus are the rounded sides of the prothorax, contracted therefore at the base, the more convex elytra, and the larger anterior coxæ. These characters might have been made more trenchant, but that I have left them sufficiently open in order to include *Hathlia zebrina*, Pasc., an Indian species which it is scarcely desirable to separate generically at present.

PRAONETHA PLEURICAUSTA.

P. fusca, rude pubescens; prothorace subquadrato; elytris breviusculis, carinulatis, postice abrupte declivibus, basi piloso cristatis, apice truncatis, lateribus obscure fusco plagiatis; antennis concoloribus.

Hab. Port Albany (north coast).

Covered with a rough pale-brownish pubescence; head impunctate; prothorax subquadrate, scarcely broader than the head, the sides almost parallel; elytra compressed, rather short, abruptly declivous posteriorly, the apex truncate, each elytron with three or four elevated lines on each side, the innermost with three slightly pilose crests; at the base, middle, and apex, and towards the outer margin a large dull brownish patch; body beneath and legs brown, partially pubescent; antennæ shorter than the body, brownish. Length 4½ lines.

This is the second Australian species of a large genus which abounds in the Malay archipelago and is found as far north as Japan. It should be placed near *P. propinqua* and *P. iliaca* from Borneo.

SYBRA CENTURIO.

S. fusca, nitida, lateribus griseo pubescentibus; elytris subelongatis, singulis biseriatim griseo guttulatis, apicibus productis, anguste acutis, dehiscentibus.

Hab. New South Wales.

Dark brown, shining; the sides more or less densely covered with a greyish pubescence, which takes the form of stripes above and below the eye and on the prothorax, but which are less definite on the elytra, and are accompanied by two rows of small greyish spots, the outer extending from the shoulder nearly to the apex, the inner row, between the suture and stripe, composed of about five or six distinct spots; head loosely pubescent in front; middle of the disk of the prothorax nearly glabrous, sparingly punctured; scutellum semicircular; elytra very slightly pubescent, except at the sides, the punctures subseriately arranged and confined to the basal half; body beneath brown, shining, speckled with a greyish pubescence; legs and antennæ brown, slightly pubescent, the latter ringed with ashy. Length 6 lines.

This well-marked species belongs to the second of the artificial sections proposed by me in 'Long. Malay.' (p. 214), into which a part of the extensive genus *Sybra* was located. The only other Australian species of this section (*S. acuta*) is less related to the above than some of the Malayan species—*S. pulverea* for example.

ESSISUS.

Caput haud elongatum; fronte quadrata, convexa, infera, subhorizontali, apice producto; tuberibus antenniferis validis, subparallelis. *Oculi* haud divisi, mediocres. *Palpi* maxillares acuti. *Antennæ* 11-articulatæ, fimbriatæ, corpore paulo longiores (♂), vel breviores (♀); *scapo* cylindrico, modice elongato, piloso; articulo secundo breviter obconico; tertio scapo longiore; quarto tertio æquali, apice infra plumoso; articulis sequentibus multo brevioribus. *Prothorax* cylindricus, capite haud latior. *Elytra* breviuscula, angustata, parallela, apicibus rotundatis. *Pedes* brevissimi, æquales; *femora* incrassata; *tarsi* art. penultimo profunde diviso, ultimo mediocri. *Pro-* et *mesosterna* simplicia.

The subfamily *Hippopsinæ*, to which this genus belongs, has not been hitherto represented in Australia, although at least two genera occur in New Guinea, and others in the Malay region, as well as in Africa and America. The present genus, however, has very little affinity to either of these, but in habit more nearly resembles *Pentacosmia*, which is also Australian, although belonging to quite a different group. Of the two specimens before me, one (a male) is very much smaller, with longer antennæ, and the last seven joints, when taken together, quite as long as the preceding four; while in the female the first four are half as long again as the seven following. The species appears to vary as to depth of colour and amount of greyish marking.

ESSISUS DISPAR.

E. brunneus, griseo varius, plumis antennarum nigris.

Hab. Queensland.

Reddish brown; the head and prothorax darker, sparingly pilose, and coarsely punctured above; sides of the prothorax and sides and posterior part of the elytra covered with a greyish pubescence; antennæ reddish brown, the plume on the fourth joint dark brown or black; body beneath brownish, with a sparse grey pubescence. Length 2–3½ lines.

AGAPETE VESTITA.

A. nigrescens; capite prothoraceque, macula magna laterali excepta, rufo-fulvis, crebre et subtiliter punctulatis.

Hab. South Australia (Gawler).

Head and prothorax of equal breadth, reddish fulvous, except a large black spot on the side of the latter, minutely and finely punctured, slightly pubescent, and having also a few short erect black hairs; scutellum dark brown; elytra obscure greyish, extending to the end of the first abdominal segment; sterna and abdomen black, the sides of the former with a coarse whitish pubescence; legs black; antennæ brownish. Length 6 lines.

This species has longer elytra than either *A. carissima* or *Kruesleræ*; from the former, with which it agrees most in colour, it is distinguished by the narrower outline of the prothorax nearly parallel at the sides, and its (and the head's) minute and closely set puncturation.

EARINIS KRUESLERÆ.

E. nigra; capite, frontee xcepta, prothoraceque hoc flavis, basi punctato; elytris circa scutellum, et fasciis duabus, una ante medium interrupta, flavis; antennis concoloribus.

Hab. South Australia (Gawler).

Black, with scattered erect hairs; head yellow, space between the eyes black; prothorax yellow, the anterior border not raised as in *E. mi-*

mula, the base punctured, as well as the disk; scutellum small, black; elytra black, the apices more pointed than in *E. mimula*, space round the scutellum, band before the middle, but interrupted at the suture, and another band between the middle and apex, yellow; body beneath, except the sterna, dull yellowish, the abdomen darker; legs black; antennæ entirely black. Length 5 lines.

I have great pleasure in dedicating this beautiful little Longicorn to Mrs. Kruesler, of Gawler, to whom I have been indebted for so many interesting novelties.

APOSITES PUBICOLLIS.

A. rufo-brunneus; prothorace pone apicem constricto, lateribus et basi griseo pubescentibus; elytris confertim punctatis.

Hab. Western Australia.

Head and prothorax pitchy brown, covered, except on the disk of the latter, with a coarse whitish or greyish pubescence; elytra nearly glabrous, reddish brown, each with four raised longitudinal lines, the intervals closely and rather finely punctured; the apex spinose at the suture; body beneath with a close grey pubescence; legs dark reddish brown; the tarsi paler; antennæ pale reddish brown, about a third longer than the body, the third and fourth joints not dilated; prothorax broadly constricted behind the apex, the middle part swelling out into an obtuse prominence; anterior coxæ strongly exserted, their acetabula broadly angulated externally. Length 13 lines.

In this species the anterior coxæ are quite conical, and the angles of their acetabula considerably larger than in *A. macilentus*; the prothorax is also constricted anteriorly, and the abdomen does not extend beyond the elytra. In these respects, and in the cylindrical third and fourth antennary joints, this species rather recedes from the type; the latter character, however, may be only sexual. The habit of the two species is almost identical. In the British Museum.

URACANTHUS SIMULANS.

U. griseo pubescens, plaga triangulari fusca nitida pone humeros, apice elytrorum singulorum extus rotundato, dein tenuiter sinuato, sutura in spinam exeunte.

Hab. South Australia.

Entirely covered with a uniform greyish pubescence, except a triangular glossy brown patch behind the shoulder, but the patch smaller and not bordered with a densely pubescent line as in *U. triangularis*: elytra shorter than in that species, and with their apices pubescent; prothorax slightly angulated on each side in the middle; body beneath and legs closely pubescent; antennæ with a finer pubescence. Length 10–11 lines.

It will be seen from the diagnosis that the form of the apices of the elytra is very different from that of *U. triangularis*, to which it bears a close resemblance.

URACANTHUS MINIATUS.

U. supra ferrugineus, pube miniata tectus; abdomine, antennis pedibusque nigris; apicibus elytrorum rotundatis.

Hab. Western Australia.

Ferruginous above, covered with a coarse yellowish-red pubescence; abdomen, legs, and antennæ black, with a very slight pale-greyish pubescence; sterna reddish; head slightly punctured; clypeus strongly marked; posterior half of the prothorax much broader than the anterior, elytra a little incurved at the sides, the apices rounded; eyes smaller than in other species of the genus, and considerably less approximate beneath; antennæ not reaching to the end of the elytra; mandibles and palpi brownish, the former irregularly punctured. Length 8 lines.

A slightly aberrant form of the genus, owing to its colour and smaller eyes. The specimen in the British Museum, the only one I have seen, is probably a female.

OMOPHŒNA TÆNIATA.

O. nigra, confertim punctata; elytris singulis lineis duabus subelevatis et vitta aurantiaca ornatis; antennis nigris, articulis 4^{to}, 5^{to}, et 6^{to} dimidio basali, albis.

Hab. ——.

Black, slightly nitid, with numerous slender erect hairs on the upper parts and legs; a bright orange stripe running from the shoulder to the apex; head and prothorax closely punctured, the latter broader than the head, narrower at the base, the sides somewhat parallel, the disk with three almost obsolete tubercles; elytra scarcely broader than the prothorax, the sides parallel, two indistinct elevated lines on each; body beneath black, the abdomen brownish, shining; legs and antennæ black, the fourth, fifth, and sixth joints of the latter with their basal halves white. Length 4 lines.

Omophœna is distinguished from its allies by its 10-jointed antennæ. The type (*O. Kruesleræ*) differs from the present more particularly in the form of its prothorax, which is narrower, and more rounded at the sides, and in the absence of any raised lines on the elytra. In the British Museum.

SIDIS.

Caput triangulare. *Oculi* magni, reniformes, supra distantes. *Antennæ* breves, basi remotæ, *scapo* basin versus attenuato et curvato, articulo tertio breviore, cæteris cum tertio æqualibus. *Palpi* breves, triangulares. *Prothorax* elongatus, medio lateraliter nodoso-rotundatus. *Elytra* depressa, elongata, parallela. *Coxæ* anticæ globosæ. *Pedes* breves; *femora* incrassata; *tibiæ* sublineares; *tarsi* attenuati, breves. *Corpus* breviter setosum.

Differs from the above and other nearly allied genera in its shorter antennæ, the basal joint of which is, notwithstanding, longer than any of the others, and its shorter legs. The species described below has its whole upper surface clothed with minute setaceous hairs. In colour and general appearance it bears a certain resemblance to *Opilus mollis*.

SIDIS OPILOIDES.

S. testacea; capite prothorace rufo-brunneis; elytris pone medium castaneis.

Hab. South Australia (*Mr. Odewahn*).

Testaceous, covered above with short setaceous hairs; head and prothorax reddish, very coarsely and closely punctured; scutellum rather large, ovato-triangular; elytra, especially at the base, covered with large deep punctures, on the posterior third, which is of a chestnut-brown colour, they are much smaller and shallower, and less crowded, the anterior testaceous portion is also in its middle a little clouded with chestnut; body beneath testaceous; the abdomen inclining to brown; legs also testaceous, the tibiæ and tarsi darker; antennæ reddish testaceous, a little more than half the length of the body. Length 3 lines.

ACYRUSA.

Caput antice breviter triangulare, pone oculos vix constrictum. *Oculi* magni, reniformes, supra distantes. *Antennæ* sublineares; scapo brevi, basi curvato et attenuato; articulo tertio longiore, apice spinoso; sequentibus brevioribus et æqualibus. *Palpi* breves, obtusi. *Prothorax* elongatus, inæqualis, medio lateraliter nodosus. *Elytra* depressa, parallela, apice rotundata. *Coxæ* anticæ globosæ. *Femora* elongato-clavata; *tibiæ* graciles; *tarsi* attenuati, breves, postici longiores. *Corpus* setosum.

The type of this genus, *Obrium ciliatum*, was described by me in the 'Ent. Trans.' ser. 3. vol. i. p. 559; at the same time I expressed an opinion that this and other species also referred to that genus, would have eventually to be separated. But the question occurs, What is the importance to be attached to the spine at the apex of the third antennary joint? Like all the other characters of the Longicornia, it is, as it appears to me to be, a question of experience, to be answered according to the weight we attach to other characters, which will or ought to decide the general affinities of the species in question. If we leave *Acyrusa* in the neighbourhood of *Obrium*[*], how is *Phoracantha* (some of the species of which approach it very nearly in their characters) to be distinguished?

IGENIA.

Characteres ut in *Obrio*, sed *coxæ* anticæ globosæ, haud eductæ.

Proposed for the reception of *Obrium ibidionoides*, Pasc. (Trans. Ent. Soc. ser. 2. v. p. 26). To this I would add *Obrium dorsale*, Pasc. (Journ. of Entom. ii. p. 237). Between the two, but more intimately allied to the latter, is the following new species (it may be thought that the radical difference in the anterior coxæ shows that this genus has nothing whatever to do with *Obrium*) :—

IGENIA STIGMOSA.

I. luteo-testacea; capite, fascia lata postica et lineis duabus ante medium elytrorum castaneis.

Hab. South Australia (*Mr. Odewahn*).

Yellowish testaceous: the head, a broad band near the apex of the elytra, and an oblong dash on each side between the band and the base, brownish chestnut; head coarsely punctured in front, and forming between the eyes longitudinal ridges; prothorax about half as long again as broad, nodose at the sides, irregularly punctured, the punctures leaving about five smooth spaces on the disk; scutellum triangular; elytra rather narrow, subseriate-punctate, the punctures coarse, but becoming gradually less so posteriorly, behind the middle a broad chestnut band, not touching the apex; body beneath luteous, shining; band between the eyes (beneath) and last four abdominal segments chestnut; legs luteous, the tips of the tibiæ and tarsi darker; antennæ dusky luteous, the third joint longer than either the scape or the fourth joint[†]. Length 4½ lines.

SISYRIUM.

Caput antice breve. *Oculi* magni, reniformes, supra modice distantes. *Antennæ* longitudine corpori æquales; articulo tertio quam scapus longiore, mutico; articulis ultimis vix compressis. *Prothorax* oblongus, capite latior, lateraliter irregularis. *Elytra* parallela, apice rotundata. *Pedes* mediocres, postici longiores; *tarsi* breves; *acetabula* antica cicatricosa, vix angulata.

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[*] *Obrium* now contains only the three European species *cantharinum*, L., *brunneum*, Fab., and *bicolor*, Kraatz, the North-American *O. maculatum*, and probably a few others from the United States.

[†] In *I. ibidionoides* it is longer than the fourth, but shorter than the scape; in *I. dorsalis* it is a trifle shorter than either.

This genus scarcely differs from the former; and, on the other hand, it is not to be distinguished from some of the smaller aberrant species of *Phoracantha*, except for the absence of the spine on the third joint of the antennæ, and the more cylindrical form of their terminal joints. The type is *Sisyrium tripartitum*, Pasc. (*Obrium*) (Journ. of Entom. ii. p. 238).

PHALOTA COLLARIS.

P. fusca, subnitida, disperse pubescens, capite nigro; prothorace luteo.

Hab. South Australia (*Mr. Odewahn*).

Dark brown, approaching to black, with a very scanty pubescence composed of small whitish erect hairs; head black; prothorax and breast yellow; scutellum black, subscutiform, rounded behind; elytra depressed, twice as broad as the prothorax at the base, thickly punctured, the apex of each rounded; body beneath (except the breast), legs, and antennæ glossy brown. Length 3 lines.

A broader insect than *Phalota tenella*, and at once distinguished by its black head. The characters of the genus in the above work were drawn up from a female, but the figure given was from a male. In the latter it will be seen that the fifth and succeeding antennary joints are much longer than the third and fourth; and therefore the term subequal, applied to them, requires modification. *P. collaris* is described from a female; doubtless the male will be found to have also longer antennæ.

XYSTŒNA.

Caput pone oculos constrictum et elongatum; *fronte* subverticali, turgida; *mandibulis* parvis. *Oculi* remote divisi, parte superiore supra distantes. *Antennæ* remotæ, lineares, setuliferæ, articulo basali subelongato, curvato, apicem versus sensim incrassato, tertio et quarto brevioribus, cæteris paulo longioribus et subæqualibus, vel parum decrescentibus. *Palpi* modice elongati, articulo ultimo obconico. *Prothorax* antice et postice constrictus, medio lateraliter nodosus. *Elytra* elongata, depressa, parallela. *Pedes* breves; *femora* modice incrassata; *tarsi* graciles, articulo basali elongato; *coxæ* anticæ elongatæ, contiguæ; *acetabula* antica valde extus angulata. *Mesosternum* depressum.

Allied to *Phalota*, especially in the remarkable character of the head (longer and more constricted, however, behind the eyes), in the different form of the prothorax, in the lengthened basal joint of the tarsi, and in the largely angular anterior acetabula. With regard to the latter character, I am afraid too much stress has been laid on it. M. J. Thomson, in his 'Systema,' divides his

"*Cerambycitæ*" into two subtribes—those with the anterior acetabula rounded, and those with them angulated externally; but, in fact, it is little more than a question of degree; and his "groupe" (not "cohorte" or "sous-tribu") "*Cerambycitæ veræ*," belonging to his second subtribe, has them only slightly (paulo) angulated externally, in which case it is not to be distinguished, so far as this character is concerned, from those in his first subtribe "*Callichromitæ*," in which it varies from a closed slit or cicatrix slightly open at its commencement and therefore forming a little angle, to the whole side of the acetabulum prolonged into a large angle, as in *Tragocerus* and other genera. In fact, M. Léon Fairmaire, notwithstanding the numerous divisions which he has formed for the European Longicorns, only places *Callichroma* and *Cerambyx* in the same "groupe," while in M. Thomson's 'Systema' they represent respectively the two great subtribes mentioned above.

XYSTŒNA VITTATA.

X. fusco-testacea; elytris albescentibus, sutura et linea longitudinali exceptis.

Hab. Queensland.

Brownish-testaceous, sparsely clothed with pale, delicate, erect hairs; head finely and closely punctured, a deeply impressed line in front; prothorax also finely punctured, longer than broad, its disk with two oblong, slightly nitid gibbosities; scutellum subquadrate; elytra very pale yellowish white, shining as if varnished, minutely and irregularly punctured, the suture and stripe on each elytron (neither quite extending to the apex) brownish testaceous; body beneath and legs glossy luteous brown. Length 4 lines.

BETHELIUM.

Caput antice brevissimum, tuberibus antenniferis fere obsoletis. *Oculi* lunulati, mediocres, grosse granulati. *Antennæ* corpori æquales vel longiores, lineares, basi distantes, scapo obconico, articulo tertio æquali, quarto abbreviato, sequentibus quam præcedentes longioribus. *Prothorax* oblongus, basi angustior, ad latera rotundatus, disco æquali. *Elytra* parallela. *Coxæ* anticæ globosæ. *Acetabula* antica breviter angulata. *Pedes* mediocres; *femora* clavata. *Pro-* et *mesosterna* elevata. *Corpus* depressum.

The type of this genus was originally described by Mr. Newman without any generic name, and with the specific one of "*signiferum*;" at the same time he indicated it as being a "G. n. *Callidio* affine." In the same genus he also placed "—— *piceum*," which, however, was an old Fabrician species, and is now known as the *Callidiopsis scutellaris*. *Bethelium* is distinguished from the greater part of the genera of this subfamily by the form of the prothorax. My *Callidium inscriptum* belongs also to *Bethelium*.

Callidiopsis, long ago proposed to be separated from *Phoracantha*, has been recently described by M. J. Thomson, who has also adopted *Callirhoë*, though under another name; and thus it becomes necessary to examine what remains. *Phoracantha* as a genus was never in a very satisfactory state. Mr. Newman characterized it in a most general way (it was difficult, indeed, to do otherwise), but giving as a reason that "descriptionem fusiorem haud requirat genus percognitum." It included several series of forms, each of which, taken as a group of species, could scarcely be distinguished by characters without admitting certain exceptions, or by using others which further observations might prove to be only of specific importance; and hence *Phoracantha* has stood, like many other genera, a collection of many discrepant species. With the materials I have before me, I have proposed the following genera, which I think will be found to include only obviously related species, and no others. They are taken in an ascending scale, *Phorocantha* standing nearly in the middle. The characters of *Phoracantha*, as here limited, are as follows:—

PHORACANTHA.

Caput pone oculos haud elongatum; *frons* brevis, apice lata. *Labrum* transversum. *Antennæ* elongatæ (♀ multo breviores), articulis subteretibus, 3^{io}–6^{tum} apice spinosis. *Prothorax* latus, longitudine latitudini fere æquali, lateribus spinosis. *Elytra* oblonga, apicibus bispinosis. *Femora* in medio vix incrassata; *tibiæ* anticæ rectæ. *Corpus* plerumque robustum.

The type is *Phoracantha semipunctata*, Fab. (*Stenochorus*).

EPITHORA.

Caput pone oculos elongatum; *frons* brevis, apice angustata. *Labrum* parvum. *Antennæ* corpore duplo longiores, articulis cylindricis, 3^{io}–7^{mum} apice spina valida instructis. *Prothorax* oblongus, lateribus inæqualis. *Elytra* elongata, apicibus bispinosis. *Femora* in medio incrassata; *tibiæ* anticæ curvatæ. *Corpus* elongatum.

The type is *Epithora dorsalis*, MacLeay (*Stenochorus*). This genus is peculiarly distinguished by the greater length of the head, and the curved anterior tibiæ.

Mr. Newman has done little more than suggest the name of *Callirhoë* for the following, in the event of its being "raised to generic honours." Mr. Hope includes it in his genus *Coptocercus*.

CALLIRHOË.

Frons subbrevis, apice angustata. *Labrum* parvum. *Antennæ* articulis

3^{io}–6 vel 7^{mum} apice spinosis. *Prothorax elongatus*, lateribus tuberculatus (ex. *aberrans* et *polita*). *Elytra* modice elongata, apicibus uni- vel bispinosis (ex. *pubescens*). *Femora* valde clavata, basi elongata. *Corpus* angustatum.

The type is *Callirhoë biguttata*, Don. (*Stenochorus*). The long, strongly clavate femora, and narrow body, will in general at once distinguish this genus. These characters hold good for all the species except *C. aberrans*, which has only moderately clavate femora.

ATESTA.

Frons brevis, apice angustata. *Labrum* minutum. *Antennæ* mediocres, articulo tertio apice valde spinoso, quarto obsolete spinoso, cæteris inermibus. *Prothorax* elongatus, lateribus tuberculatus. *Elytra* parallela, apice rotundata. *Femora* in medio incrassata. *Corpus* modice elongatum.

The type is *Atesta balteata*, Pasc. (*Phoracantha*). The only genus with the apex of the combined elytra rounded; *A. Angasii*, is so far exceptional that a very short mucro may be seen with the aid of a lens at the sutural angle.

ALLOTISIS.

Frons brevis, apice lata. *Labrum* breve, transversum. *Antennæ* setaceæ, articulis tertio et quarto apice subspinosis. *Prothorax* elongatus, lateribus tuberculatus. *Elytra* parallela, apicibus truncatis, haud spinosis. *Femora* clavata, basi elongata. *Corpus* gracile.

The type is *Allotisis scitula*, Pasc. (*Phoracantha*). The spines on the antennæ are reduced to a minimum in this genus, while the truncated apices of the elytra mark the first approach to spines, which we find throughout the remainder.

DIOSPIDES.

Frons subbreve apice subangustata. *Labrum* transversum. *Antennæ* articulis depressis, 3^{io}–8^{vum} apice valde spinosis. *Prothorax* longitudine haud latior, lateraliter spinosus. *Elytra* oblonga, apicibus bispinosis. *Femora* sublinearia, *tibiæ* et *tarsi* graciles. *Corpus* robustum.

The only species is *Diospides obscurus*, Don. (*Stenochorus*). It is principally distinguished from *Phoracantha* by its linear or nearly linear femora.

TRYPHOCHARIA.

Frons paulo producta, apice angustata. *Labrum* transversum. *Antennæ* corpore vix longiores (in fœm. breviores), articulis 3^{io}–8^{vum} apice bispinosis. *Prothorax* parvus, lateraliter spinosus. *Elytra* ampliata, apicibus bispinosis (ex. *Odewahnii*). *Femora* linearia. *Corpus* peramplum.

The type is *Phoracantha hamata*, Newm. The genus is remarkable for its small prothorax and its large elytra.

XYPETA.

Frons brevissima, apice dilatata. *Labrum* mediocre. *Antennæ* corpore longiores, 11-articulatæ, articulis plus minusve depressis, 3^{io}–6^{tum} apice bispinosis, art. ultimo inciso, articulum duodecimum simulante. *Prothorax* subtransversus, lateraliter dentatus. *Elytra* oblonga, apicibus bispinosis. *Pedes* antici breves, postici longissimi; *femora* linearia, postica extremitatem corporis superantia. *Corpus* robustum.

The only species has been recently described by me under the name of *Phoracantha grallaria*, and is one of the most remarkable of the whole subfamily, owing to its very short anterior legs, and the unusual length and slenderness of the remainder.

DIDYMOCANTHA BREVICOLLIS.

D. fusca, sparse pilosa, aliter fere glabra; prothorace transverso; scutello fusco; elytris testaceis, nitidis, vage punctatis, plaga obliqua humerali et apice fuscis; antennis fœminarum corpore brevioribus.

Hab. Western Australia (Perth).

Dark brown, nearly free from pubescence, except on the antennæ, but with numerous scattered erect hairs, each arising from a comparatively large puncture; prothorax transverse, with nine tubercles, three on the disk, and three on each side; scutellum brown; elytra very distinctly punctured, the punctures small and rather dispersed, a semicircular obliquely placed mark at the shoulder, and the apex, dark brown; body beneath and legs brown, the basal half of the tibiæ fulvous; antennæ of the female shorter than the body, the first two joints brown, the third to the sixth fulvous, with brown tips, the remainder dusky. Length 7 lines.

Distinguished from *D. obliqua* by the shortness of its prothorax and antennæ, and its nearly glabrous and shining surface. My specimen was kindly presented to me by Mr. Du Boulay.

STRONGYLURUS ORBATUS.

S. brunneo-testaceus, subnitidus, pilis albis adpressis dispersis; oculis infra valde approximatis; prothorace haud maculato, epipleuris metathoracis dense niveo pilosis.

Hab. Queensland.

Brownish testaceous, subnitid, with scattered, white, mostly adpressed hairs; head contracted below the eyes, but gradually broader towards the mandibles; eyes closely approximate beneath; prothorax rather finely punctured, uniformly pilose; scutellum subscutiform, rounded posteriorly, densely covered with white hairs; elytra strongly punctured at the base, gradually becoming less so posteriorly, each puncture giving rise to a single hair, the apex of each elytron a little rounded at the suture, where it terminates in a strongly marked spine, two or four irregular, brown, and probably uncertain, zigzag spots on the disk; body beneath and legs thinly clothed with long pale-greyish hairs; the epipleuræ of the metathorax with a dense white pile; antennæ with the five basal joints covered with loose stiffish hairs, the remainder with a fine uniform pubescence. Length 12 lines.

Allied to *S. scutellatus*, Hope*, but without any spots on the prothorax, the apex of each elytron strongly spined, the eyes considerably more approximate beneath, the metathoracic epipleuræ covered with a dense white pile, and other characters.

OXYMAGIS.

Caput antice paulo productum. *Oculi* prominuli, auguste emarginati, supra distantes. *Antennæ* breviusculæ, basi remotæ; scapo modice elongato, obconico; articulis tertio et quarto brevioribus, cylindricis; cæteris paulo longioribus et subæqualibus. *Palpi* breves, articulo ultimo triangulari. *Prothorax* capite latior, apice angustus, antice utrinque rotundatus, basi bisinuatus, angulis posticis productis. *Elytra* prothorace multo latiora, oblonga, parallela. *Pedes* mediocres, antici breviores, postici longiores; *femora* in medio incrassata; *tarsi* subdilatati, fere æquales. *Acetabula* antica integra. *Prosternum* latum, elevatum, postice transverse dilatatum. *Mesosternum* elevatum, antice dilatatum et perpendiculare.

Nearly related to *Strongylurus*, Hope, but the palpi short, with the terminal joint triangular, and the pro- and mesosterna produced, with broad opposing perpendicular faces. I have dedicated the species described below to Dr. Gray.

OXYMAGIS GRAYII.

O. fuscus, sparse griseo pubescens; prothorace lateribus dense albo tomentoso; elytris brunneis; antennis, tibiis tarsisque fulvo-ferrugineis.

Hab. —— ?

Dark brown, with scattered greyish adpressed hairs, each issuing from a small puncture in the derm; head with a wide semicircular impression between the eyes; prothorax with a dense pure-white tomentose stripe on each side; elytra reddish brown, the apex of each rounded; body beneath thickly pubescent at the sides; antennæ, tibiæ, and tarsi yellowish ferruginous. Length 11 lines.

OPSIDOTA ALBIPILOSA.

O. fusca, supra sparse albo pilosa, infra dense pilosa; antennis brunneis, subtilissime pubescentibus; tarsis rufescentibus.

Hab. South Australia (Gawler).

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* This was the type of my genus *Isalium*. At the time of proposing it I was under the impression that *Strongylurus*, Hope, was synonymous with *Didymocantha*, Newm.; the former author, however, gives *S. scutellatus* as the type, not distinguishing it from *Didymocantha*, but separating *Coptopterus*.

Dark brown, covered above with numerous, slightly dispersed, white hairs, one, or sometimes two or three, issuing from a puncture in the derm; body beneath with more closely set hairs nearly concealing the derm; elytra apiculate at the suture; antennæ reddish brown, covered, except the first two joints, with a very delicate pubescence; legs brown, with a greyish pile, the tips of the tibiæ and tarsi reddish. Length 12 lines.

A much finer species than *O. infecta*, more cylindrical, the prothorax more rounded at the sides and without spots, and the tarsi more dilated, if this be not, as in some other cases, a sexual character. I owe my specimen to the kindness of Mr. Odewahn.

PAPHORA.

Caput porrectum, ovatum; tuberibus antenniferis brevibus, remotis. *Oculi* reniformes. *Antennæ* breves, scapo quam articuli tertii et quarti longiore, cæteris paulo longioribus. *Mandibulæ*, *palpi* &c. breviuscula. *Prothorax* ovatus, basi apiceque truncatus, capite paulo latior. *Elytra* breviuscula, lateribus parallela, apicibus rotundatis. *Pedes* mediocres; *femora* vix incrassata; *tibiæ* quam tarsi longiores. *Pro-* et *mesosterna* declivia, hoc haud elongatum. *Abdominis* segmenta sensim breviora.

The type of this genus is my *Ceresium*? *modestum* (Journ. Ent. ii. p. 237). The genus, however, is nearer *Bebius* (*op. cit.* p. 369); but it has no muzzle, and is altogether a much shorter form, with longer legs. It agrees with it in having the scape longer than either the third or fourth joints—a peculiarity which at present distinguishes these genera from all others of the subfamily belonging to the Australian fauna.

PORITHEA.

(♂) *Caput* antice breve, transversum. *Oculi* magni, reniformes. *Antennæ* corpore multo longiores, scapo clavato, articulo tertio longiore, quarto breviore, quinto et sequentibus longioribus. *Palpi* securiformes. *Prothorax* basi constrictus. *Elytra* parallela, apice rotundata. *Pedes* longiores; *femora* valida, valde clavata, postica elytrorum extremitatem superantia; *tibiæ* subelongatæ; *tarsi* antici dilatati. *Prosternum* simplex. *Mesosternum* declive. (♀) *Antennæ* et *pedes* breviores; *femora* minora; *tarsi* antici haud dilati.

There are three or four unpublished Malayan genera that will come between this genus and *Ceresium*. The chief characters, however, that will differentiate it from cognate forms lie in the contracted base of the prothorax, the stout clavate (not fusiform) femora, especially of the male (in which sex the posterior pair extend beyond the end of the body), and the short transverse face. The type (*Callidium intortum*, Newm.) is in Major Parry's collection; but the precise habitat of that and his other specimens, like the one in my own, is unknown.

ARIDÆUS HEROS.

A. rufo-flavus, nigro fasciatus; prothorace oblongo-ovato, antice angustato; elytris apice truncatis, angulo exteriore producto; antennis muticis.

Hab. Port Albany (north coast).

Nearly glabrous, rufous yellow, banded, or otherwise varied with black; head with a deep semicircular impression above the clypeus, labrum sinuato-emarginate; prothorax oblong ovate, narrowed anteriorly, closely punctured, the intervals sharply irregular, behind on each side a broad slightly elevated protuberance, the sides black, clothed with greyish hairs; scutellum triangular, with a fulvous-grey pilosity; elytra covered with closely-set deeply-impressed punctures, posteriorly several black tubercular points, from the scutellum on each side a black curved stripe extends downwards and outwards as far as the middle, a curved band of rufous yellow follows, the remainder black, apices truncate, the outer angle produced; body beneath and legs black, a fulvous patch on the abdomen, and the anterior femora, except at the base, fulvous; fore and intermediate tarsi clothed with yellowish hairs; antennæ black. Length 10 lines.

Besides the difference of colour, which, however, is probably variable, this species differs from *A. thoracicus* in the longer prothorax, so narrowed anteriorly as to give it an ovate form, in the very decided truncation of the elytra, and the antennæ without apical spines in the male.

HOMÆMOTA DUBOULAYI.

H. rufo-brunnea, parte apicali nigra, nitida; femoribus posticis pone corpus exeuntibus.

Hab. Western Australia (*Mr. Du Boulay*).

Reddish brown, with long slender dispersed hairs; head finely punctured, a broad groove between the eyes terminating above the mouth in a semilunar impression; prothorax with numerous shallow, almost obsolete punctures, much longer than broad, its base slightly elongated; scutellum parallel at the base, triangular towards the apex; elytra divided in the middle by an oblique ivory line, reddish brown, and thickly punctured anteriorly to this line, behind the line nearly impunctate, glossy, gradually acquiring a whitish pubescence towards the apex; body beneath black; the breast reddish brown; legs reddish brown; the femora robust, the posterior extending beyond the elytra; antennæ longer than the body, reddish brown. Length 4 lines.

This species is closely allied to *H. basalis*, but differs in colour, in the less punctured prothorax, which is much more elongated at the basal constricted portion, differently shaped scutellum, longer legs, and considerably stouter femora.

ECTOSTICTA.

Antennæ corpore breviores, scapo articulo tertio fere æquali, sequentibus brevioribus et subæqualibus. *Oculi* subtenuiter granulati. *Prothorax* basi haud attenuatus. *Acetabula* antica fere integra. Cæteris ut in *Ipomoria.*

The type of this genus is the *Callidium cleroides,* White. It is a stouter form than *Homæmota,* with which it agrees in its nearly entire anterior acetabula; but differs in the shorter antennæ, the altered proportions of their basal joints, and the rounded prothorax not attenuated at the base. The following is a new species.

ECTOSTICTA RUIDA.

E. fusca, nitida; capite prothoraceque rufis, hoc grosse punctato; scapo nitido, disperse punctato; elytris omnino confertim punctatis, flavo bifasciatis.

Hab. Champion Bay (West Australia).

Slightly pilose, dark brown, shining; head reddish, closely punctured: antennæ reddish, apices of most of the joints dark brown, the scape shining, sparingly punctured; prothorax reddish, with much larger punctures than in *E. cleroides*; scutellum subquadrate; elytra entirely punctured, but the punctures larger and less crowded posteriorly, the base reddish, between the base and middle a transverse yellowish line, interrupted at the suture, directly behind the middle a somewhat V-shaped line; body beneath shining, the last four abdominal segments and legs dark brown, the bases of the femora and sterna reddish. Length 4 lines.

IPOMORIA.

Caput insertum, triangulare, antice paulo productum, tuberibus antenniferis obsoletis. *Oculi* mediocres, reniformes, tenuiter granulati. *Antennæ* corpore breviores, basi distantes, scapo obconico; articulo tertio breviore, apice mutico; cæteris longioribus, apicibus incrassatis. *Mandibulæ* parvæ. *Prothorax* ad latera rotundatus, basi attenuatus. *Elytra* brevia, parallela. *Coxæ* anticæ globosæ, subcontiguæ. *Acetabula* antica subanguste angulata. *Femora* abrupte clavata; *tarsi* breviusculi. *Pro-* et *mesosterna* declivia. *Corpus* depressum.

Mr. Newman's genus *Monoplia* appears to be very nearly allied to this, and to be distinguished principally by the third joint of the antennæ being spined, as in *Apilocera, Cyrtophorus,* &c. *Ipomoria* is also allied to *Homæmota* and *Ectosticta,* but is differentiated from both by the shortness of the third joint of the antennæ, which is shorter than the scape.

IPOMORIA TILLIDES.

I. fusca, subnitida; prothorace longitudinaliter plicato; elytris fasciis duabus interruptis flavescentibus.

Hab. South Australia.

Dark brown, slightly nitid; head closely punctured; prothorax broader than the head, marked longitudinally with a number of short raised lines, the middle with two large shallow depressions; scutellum subquadrate, slightly bilobed at the apex; elytra not broader than the prothorax, rugosely punctured, but the punctures fewer posteriorly; each elytron with two yellowish bands, the first before the middle, widely interrupted at the suture, the second behind the middle, nearly approaching the suture; body beneath and femora glossy brown, anterior femora rather compressed; antennæ a little more than half the length of the body, pitchy, with a few long scattered hairs. Length 3 lines.

ADRIUM.

Oculi grosse granulati. *Antennæ* corpore breviores vel elytrorum medium vix superantes, articulo tertio quam scapus breviore, illo quarto æquali, sequentibus longioribus. *Prothorax* postice constrictus, disco impresso. *Acetabula* antica fere integra. Cæteris ut in *Ipomoria.*

Callidium catoxanthum, White, is the type of this genus, which, like *Ipomoria* and *Ectosticta*, has more the habit of a *Callidium* than of a *Clytus*; nevertheless the coarsely granulated eyes and nearly entire anterior acetabula are at variance with the two most important characters of the *Callidiinæ.*

ŒBARINA.

Caput antice breve, tuberibus antenniferis obsoletis. *Oculi* magni, anguste emarginati, grosse granulati. *Antennæ* corpori vix æquales, vel breviores, graciles, basi modice distantes, scapo brevi, obconico, articulo quarto quam tertius breviore, cæteris longioribus et æqualibus vel fere æqualibus. *Palpi,* præsertim maxillares, elongati, articulo ultimo triangulari. *Prothorax* oblongus, lateribus subparallelis vel leviter rotundatis. *Elytra* elongata, parallela. *Pedes* modice elongati; *femora* fusiformia; *tibiæ* sublineares; *tarsi* graciles, posticæ fere lineares. *Coxæ* anticæ globosæ. *Acetabula* antica integra. *Prosternum* angustum, postice acutum. *Mesosternum* latum, declive. *Corpus* depressum.

Differs from *Phacodes*, Newm., in the elongate palpi terminating in a broadly triangular joint, and in the slender and nearly linear tarsi.

ŒBARINA TRISTIS.

Œ. fusca, nitida, sparse albo hirta; prothorace lateribus subparallelis.

Hab. South Australia (*Mr. Odewahn*).

Dark brown, shining, with scattered stiff whitish hairs; head and prothorax equal in breadth, covered with close confluent punctures; the latter oblong, narrower posteriorly, with its sides somewhat parallel; scutellum whitish from numerous close-set and decumbent hairs; elytra a little broader than the prothorax, thickly but not confluently punctured, the sides perfectly parallel, the apex rounded; body beneath and legs chestnut-brown, shining, with sparse decumbent hairs; antennæ brownish testaceous, rather shorter than the body. Length 5 lines.

Œbarina ceresioides.

Œ. fusca, nitida, sparse albo hirta; prothorace lateribus rotundatis.

Hab. South Australia (*Mr. Odewahn*).

Dark brown, shining, with scattered stiff whitish hairs; head narrower than the prothorax; the latter rounded at the sides, and scarcely longer than broad, both coarsely and confluently punctured; scutellum triangular, hairy, white; elytra closely and more coarsely punctured than in *Œ. tristis*, and slightly incurved behind the shoulders; body beneath and legs as in *Œ. tristis*, but the postpectus reddish testaceous; antennæ pale ferruginous, much shorter than the body. Length 7 lines.

LAMIIDÆ.

ACANTHODERINÆ.

Hebesecis.

Hebesecis, *Pascoe, Journ. of Entom.* ii. p. 353.

Hebecerus, *J. Thomson, Essai, etc.* p. 342 (non *Kolenati*).

Hebesecis marginicollis. (Acanthocinus marginicollis, *Boisduval, Voy. de l'Astrol.* ii. p. 490, pl. 9. f. 12.)

Hab. South Australia; Victoria; New South Wales; Queensland; Tasmania.

H. lineola. (Acanthocinus lineola, *Newman, Zool.* 1855, *App.* cxxx. Qu. var. Hebecerus marginicollis, *Bois.*?)

Hab. Victoria; Kangaroo Island; Tasmania.

H. Australis. (Acanthocinus Australis, *Boisduval, Voy. de l'Astrol.* ii. p. 489. Hebecerus inglorius, *Newman, Entom.* p. 361.)

Hab. Victoria; New South Wales; South Australia.

H. crocogaster, *Boisduval, Voy. de Astrol.* ii. p. 492.

Hab. South Australia; Victoria; New South Wales; Western Australia.

H. conferta, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 528.

Hab. Queensland.

H. niphonoides, *Pascoe, ib.* p. 527.

Hab. Port Curtis, Western Australia.

H. sparsa, *Pascoe, antè*, p. 81.

Hab. Western Australia.

? H. FUSCICORNIS. (Acanthoderes fuscicornis, *Germar, Linn. Ent.* iii. p. 227.)
Hab. South Australia.

H. VARICORNIS. (Crossotus varicornis, *Germar, Linn. Ent.* iii. p. 229. ? H. marginicollis, *Bois.*)
Hab. South Australia; New South Wales.

H. GERMARI, *Pascoe, Journ. of Entom.* ii. p. 352.
Hab. South Australia.

H. SORDIDA, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 527. (Velora Australis, *Thomson, Syst. Ceramb.* p. 56.)
Hab. Clarence River.

H. ANTENNATA, *Pascoe, Journ. of Entom.* ii. p. 353.
Hab. Port Denison.

PROBATODES.

Probatodes, *J. Thomson. Syst. Ceramb.* p. 56.

PROBATODES PLUMULA. (Acanthocinus? plumula, *Newm. Zool.* 1855, *App.* cxxx.)
Hab. Tasmania; Victoria.

AMEIPSIS.

Ameipsis, *Pascoe, Journ. of Entom.* ii. p. 354.

AMEIPSIS MARGINICOLLIS, *Pascoe, ib.* p. 354.
Hab. Queensland.

PROSOPLUS.

Prosoplus, *Blanchard, Voy. au Pôle Sud,* iv. p. 290.

PROSOPLUS HOLLANDICUS. (Acanthocinus Hollandicus, *Boisd. Voy. de l'Astrol.* ii. p. 491.)
Hab. ——?

EXOCENTRINÆ.

PENTACOSMIA.

Pentacosmia, *Newman, Entom.* p. 361.

PENTACOSMIA SCOPARIA, *Newm. Ent.* p. 361.
Hab. Victoria; Queensland.

NEISSA.

Neissa, *Pascoe, antè,* p. 82.

NEISSA INCONSPICUA, *Pascoe, antè,* p. 82, tab. 3. fig. 4.
Hab. Gawler.

N. NIGRINA, *Pascoe, antè,* p. 82.
Hab. Gawler.

ILLÆNA.

Illæna, *Erichson, Wiegmann's Arch.* 1842, p. 225.

ILLÆNA EXILIS, *Erichson, ib.* p. 225.
Hab. Tasmania.

MESOSINÆ.

BUCYNTHIA.

Bucynthia, *Pascoe, antè,* p. 83.

BUCYNTHIA SPILOPTERA. (Hygocera spiloptera, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 542.)
Hab. Hunter's River.

NIPHONINÆ.

ÆGOMOMUS.

Ægomomus, *Pascoe, Long. Malay.* p. 59.
Micracantha, *Montrouzier* (nom. præoc.?), *Ann. de la Soc. Ent. de France,* ser. 4. i. p. 271.

ÆGOMOMUS WOODLARKIANUS. (Penthea Woodlarkiana, *Montrouzier, Faune de Woodlark,* p. 65. Niphona Bakewellii, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 38. Praonetha porosa, *Faldermann.*)
Hab. Queensland.

Æ. TOROSUS. (Niphona torosa, *Pascoe, Journ. of Entom.* ii. p. 223.)
Hab. South Australia.

Æ. MISELLUS, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 529.
Hab. Port Curtis.

Æ. OBLITUS, *Pascoe, ib.* p. 530.
Hab. New South Wales.

Æ. IRATUS, *Pascoe, Ann. & Mag. Nat. Hist.* ser. 3. ix. p. 464.
Hab. Lizard Island.

Æ. INSULARIS, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 39 (1857).
Coptops abdominalis, *White, Ann. & Mag. Nat. Hist.* 3 ser. ii. p. 273 (1858).
Hab. Port Essington.

CORRHENES.

Corrhenes, *Pascoe, Journ. of Entom.* ii. p. 355.
Saperda, *Germar, Linn. Ent.* iii. p. 230.

CORRHENES PAULA. (Saperda paula, *Germar, ib.* p. 230.)
Hab. New South Wales; South Australia; Victoria.

C. FUNESTA. (Saperda funesta, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 53.)
Hab. South Australia.

C. STIGMATICA. (Saperda stigmatica, *Pascoe, ib.* ser. 3. i. p. 544.)
Hab. Port Curtis.

C. MYSTICA. (Saperda mystica, *Pascoe, ib.* p. 545.)
Hab. New South Wales?

C. GUTTATA, *Pascoe, Journ. of Entom.* ii. p. 355.
Hab. New South Wales.

SYSSPILOTUS.

Sysspilotus, *Pascoe, ib.* p. 359.

SYSSPILOTUS MACLEAYI, *Pascoe, ib.* p. 360.
Hab. Rockhampton.

SYMPHYLETES.

Symphyletes, *Newman, Entom.* p. 362.

SYMPHYLETES NODOSUS, *Newman, ib.* p. 362. (Lamia pulverulens, *Boisduval, Voy. de l'Astrol.* ii. p. 501. L. subfasciata, *Hope.*)
Hab. Victoria; New South Wales; Queensland.

S. FUMATUS, *Pascoe, Journ. of Entom.* ii. p. 224.
Hab. South Australia.

S. ARCTOS, *Pascoe, ib.* p. 356.
Hab. Western Australia; South Australia.

S. PEDICORNIS. (Lamia pedicornis, *Fabricius, Syst. Ent.* p. 170. Cerambyx pedicornis, *Olivier, Ent.* no. lxvii. pl. 16. f. 119, p. 94.)
Hab. New South Wales; Port Curtis.

S. INGESTUS, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 537.
Hab. New South Wales.

S. VETUSTUS, *Pascoe, Ann. & Mag. Nat. Hist.* ser. 3. ix. p. 264.
Hab. Lizard Island.

S. MORATUS, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 536.
Hab. Port Curtis.

S. DEVOTUS, *Pascoe, antè,* p. 83.
Hab. Western Australia.

S. SOLUTUS, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 535.
Hab. Port Curtis.

S. MUNITUS, *Pascoe, ib.* p. 536.
Hab. Clarence River.

S. NEGLECTUS, *Pascoe, ib.* p. 534.
Hab. New South Wales.

S. SODALIS, *Pascoe, ib.* ser. 2. iv. p. 41.
Hab. Queensland.

S. FARINOSUS, *Pascoe, ib.* ser. 3. i. p. 533.
Hab. Port Curtis.

S. ANGASII, *Pascoe, Journ. of Entom.* ii. p. 225, pl. 11. f. 1.
Hab. South Australia; Western Australia.

S. PUBIVENTRIS, *Pascoe, ib.* i. p. 339.
Hab. South Australia.

S. DUBOULAYI, *Pascoe, antè*, p. 83.
Hab. Western Australia.

S. MACULICORNIS, *Pascoe, Trans. Ent. Soc.* ser. 2. iv. p. 250.
Hab. Western Australia.

S. SUBTUBERCULATUS, *White, Ann. & Mag. Nat. Hist.* ser. 3. ii. p. 269.
Hab. ——?

S. FULVESCENS, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 531.
Hab. Port Curtis.

S. SUBMINIATUS, *Pascoe, antè*, p. 84.
Hab. Western Australia.

S. CINNAMOMEUS, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 59.
Hab. Queensland.

S. LATERALIS, *Pascoe, ib.* ser. 2. iv. p. 250.
Hab. Western Australia; South Australia.

S. COLLARIS. (Saperda collaris, *Donovan, Epit. Ins. N. Holl. &c.* pl.
Hab. ——?

S. DECIPIENS, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 532.
Hab. South Australia.

S. NIGRO-VIRENS, *Donovan, Ins. of New Holland*, pl.
Hab. New South Wales; Queensland.

S. DERASUS, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 532.
Hab. New South Wales.

S. EGENUS, *Pascoe, Journ. of Entom.* ii. p. 225.
Hab. North Australia.

S. SATELLES, *Pascoe, ib.* p. 357.
Hab. Western Australia.

S. SIMIUS, *Pascoe, antè*, p. 85.
Hab. Champion Bay (Western Australia).

S. BATHURSTII, *Pascoe, antè*, p. 85.
Hab. South Australia (Gawler).

S. VARIOLOSUS, *Pascoe, Journ. of Entom.* i. p. 340.
Hab. New South Wales; Queensland; South Australia.

S. ILIACUS, *Pascoe, antè* p. 84.
Hab. Champion Bay (Western Australia).

S. VICARIUS, *Pascoe, Journ. of Entom.* ii. p. 356.
Hab. New South Wales? Queensland.

S. HUMERALIS, *White, Ann. & Mag. Nat. Hist.* ser. 3. ii. p. 269.
Hab. North Australia (Port Essington).

S. GALLUS, *Pascoe, Journ. of Entom.* ii. p. 226.
Hab. North Australia (*Stewart's Expedition*).

S. ALBO-CINCTUS. (Saperda albo-cincta, *Guérin, Voy. de la Coq.* t. ii. p. 137, pl. 7. f. 7. Rhytiphora Donovani, *Newman, Zool.* 1851, *App.* cxxix. ?S. collaris, *Donovan.*)
Hab. New South Wales; Queensland.

S. VESTIGIALIS, *Pascoe, Journ. of Entom.* ii. p. 226.
Hab. South Australia.

S. SOLANDRI. (Lamia Solandri, *Fabricius, Syst. Ent.* p. 177. Cerambyx Solandri, *Olivier, Entom.* no. lxvii. pl. 16. f. 118, p. 100.)
Hab. New South Wales.

IPHIASTUS.

Iphiastus, *Pascoe, Journ. of Entom.* ii. p. 357.

IPHIASTUS HEROS. (Symphyletes heros, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 531; *Journ. of Entom.* ii. pl. 16. f. 4.)
Hab. (Interior?) Australia (*Stewart's Expedition*).

PLATYMOPSIS.

Platymopsis, *J. Thomson, Arch. Entom.* i. p. 187.

PLATYMOPSIS OBLIQUA. (Lamia obliqua, *Donovan, Ins. New Holl.* pl.)
Hab. Queensland; New South Wales; South Australia.

P. TUBERCULATA. (Rhytiphora tuberculata, *Hope, Ann. & Mag. Nat. Hist.* 1842, ix. p. 429.)
Hab. Port Essington.

P. ARMATULA. (Sympheletes (Platymopsis) armatulus, *White, Proc. Zool. Soc.* 1859, p. 122, pl. 59. f. 8.)
Hab. (South?) Australia.

RHYTIPHORA.

Rhytiphora, *Serville, Ann. Soc. Ent. de France*, iv. p. 37.

RHYTIPHORA RUGICOLLIS. (Lamia porphyrea, *Donovan.* L. rugicollis, *Dalman, Schön. Syn. Ins.* iii. *App.* 169.)
Hab. New South Wales; Queensland.

R. AMICULA, *White, Proc. Zool. Soc.* 1859, p. 122, pl. 59. f. 7.)
Hab. Victoria River.

R. POLYMITA, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 60.
Hab. Queensland.

R. WATERHOUSEI, *Pascoe, Journ. of Entom.* ii. p. 228.
Hab. South Australia.

R. PIPERITIA, *Hope, Ann. & Mag. Nat. Hist.* 1842, ix. p. 429.
Hab. Port Essington.

R. DETRITA, *Hope, Ann. & Mag. Nat. Hist.* 1842, ix. p. 429.
Hab. Port Essington.

R. SOSPITALIS, *Pascoe, Journ. of Entom.* ii. p. 358.
Hab. Western Australia.

R. CAPRINA, *Newman, Entom.* p. 362.
Hab. South Australia; Victoria.

R. MISTA, *Newman, ib.* p. 362.
Hab. Victoria.

R. SAGA, *Pascoe, Journ. of Entom.* ii. p. 358.
Hab. Western Australia.

R. SEMIVESTITA, *Pascoe, antè,* p. 86.
Hab. Western Australia (Perth).

R. RUBETA, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 538.
Hab. New South Wales.

R. CRETATA, *Pascoe, ib.* ser. 2. v. p. 60.
Hab. Queensland.

PENTHEA.

Penthea, *Laporte, Hist. Nat. des An. Art.* ii. p. 476.

PENTHEA VERMICULARIA. (Lamia vermicularia, *Donovan, Ins. New Holl.*)
Hab. New South Wales; Queensland.

P. SOLIDA, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 538.
Hab. Clarence River.

P. COSTATA, *Pascoe, ib.* p. 539.
Hab. New South Wales; Western Australia.

P. SAUNDERSII, *Pascoe, ib.* ser. 2. iv. p. 103.
Hab. Western Australia.

P. PULLINA, *Pascoe, ib.* ser. 3. i. p. 539.
Hab. Western Australia.

P. SANNIO. (Lamia sannio, *Newman, Entom. Mag.* v. p. 498.)
Hab. ——?

P. PARDALIS. (Lamia pardalis, *Newman, Entom.* p. 414.)
Hab. New South Wales; Queensland.

P. MILIARIS, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 540.
Hab. Port Curtis.

P. INTRICATA, *Pascoe, Journ. of Entom.* ii. p. 227.
Hab. South Australia.

P. SCENICA, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 540.
Hab. Port Curtis.

P. CRASSICOLLIS, *Pascoe, Journ. of Ent.* ii. p. 227.
Hab. Interior of Australia (*Stewart's Expedition*).

P. PICTA, *Pascoe, ib.* p. 227, pl. 11. f. 5.
Hab. South Australia.

P. SECTATOR, *Pascoe, ib.* p. 358.
Hab. South Australia.

DEPSAGES.

Depsages, *Pascoe, ib.* p. 359.

DEPSAGES GRANULOSA. (Lamia granulosa, *Guérin, Voy. de la Coq.* ii. p. 133, pl. 7. f. 8.)
Hab. New South Wales.

MONOCHAMUS.

Monochamus, *Serville, Ann. Soc. Entom. de France,* iv. p. 91.

MONOCHAMUS FISTULATOR. (Lamia fistulator, *Germar, Ins. Spec. nov.* p. 478.)
Hab. New South Wales; Queensland.

M. MIXTUS, *Hope, Ann. & Mag. Nat. Hist.* 1842, ix. p. 428.
Hab. Port Essington; Queensland.

M. ARGENTATUS, *Hope, MS.?*
Hab. New South Wales; Victoria.

M. OVINUS, *Pascoe, Journ. of Entom.* ii. p. 228.
Hab. South Australia.

METON.

Meton, *Pascoe, ib.* i. p. 342.

METON DIGGLESII, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 59.
Hab. Queensland.

M. TROPICUS, *Pascoe, Ann. & Mag. Nat. Hist.* ser. 3. ix. p. 465.
Hab. Lizard Island.

BATOCERA.

Batocera, *Laporte de Castelnau, Hist. Nat. des Ins.* ii. p. 470.

BATOCERA RUBUS. (Cerambyx rubus, *Linn. Syst. Nat.* ed. 12. ii. p. 625. Batocera rubus, *Blanchard, Hist. Nat. des Ins.* ii. p. 158, pl. 12. f. 4.)

B. BOISDUVALII. (Lamia Boisduvalii, *Hope, Charlesworth's Mag. Nat. Hist.* iii. p. 231.)
Hab. Clarence River?

HYPSELOMINÆ.

CALLIPYRGA.

Callipyrga, *Newman, Entom.* p. 414.

CALLIPYRGA TURRITA, *Newman, ib.* p. 414; *White, Stokes's Discov. in Aust.* pl. 2. f. 5. (Zygocera pallidicornis, *J. Thomson, Arch. Ent.* i. p. 190.)
Hab. New South Wales; Queensland.

ZYGOCERA.

Zygocera, *Erichson, Wiegmann's Arch.* 1842, p. 224.

ZYGOCERA PRUINOSA. (Acanthocinus pruinosus (*Macleay*), *Boisduval, Voy. de l'Astrol. Ent.* p. 489; *Westwood, Trans. Ent. Soc.* ser. 3. i. p. 626, pl. 25. f. 6.)
Hab. New South Wales; Queensland.

Z. PENTHEOIDES, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 32.
Hab. Western Australia.

Z. CÆNOSA, *Erichson, Wiegmann's Arch.* 1842, p. 223.
Hab. Tasmania.

Z. METALLICA, *Westwood, Trans. Ent. Soc.* ser. 3. i. p. 627, pl. 25. f. 7.
Hab. South Australia; Western Australia.

DEMONASSA.

Demonassa, *J. Thomson, Syst. Ceramb.* p. 327.

DEMONASSA MACLEAYI. (Zygocera Macleayi, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 32. Demonassa funeraria, *Thomson, l. c.* p. 328.)
Hab. New South Wales.

DISTERNA.

Disterna, *J. Thomson, l. c.* p. 88.

DISTERNA LUGUBRIS. (Zygocera lugubris, *Pascoe, l.c.* ser. 3. i. p. 541.)
Hab. New South Wales.

D. LUCTUOSA. (Zygocera luctuosa, *Pascoe, Ann. & Mag. Nat. Hist.* ser. 3. ix. p. 465.)
Hab. Lizard Island.

D. PLUMIFERA. (Zygocera plumifera, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 33.)
Hab. New South Wales.

D. CUNEATA. (Zygocera cuneata, *Pascoe, ib.* ser. 2. v. p. 33.)
Hab. New South Wales.

D. PUMILA. (Zygocera pumila, *Pascoe, ib.* ser. 3. i. p. 542.)
Hab. New South Wales.

D. BIFASCIATA. (Zygocera bifasciata, *Pascoe, ib.* ser. 2. v. p. 32.)
Hab. New South Wales.

ORICOPIS.

Oricopis, *Pascoe, ib.* ser. 3. i. p. 543.

ORICOPIS UMBROSUS, *Pascoe, ib.* ser. 3. i. p. 543, pl. 23. f. 2.
Hab. Port Curtis.

THYADA.

Thyada, *Pascoe ,Trans. Ent. Soc.* ser. 3. i. p. 544.

THYADA BARBICORNIS. (Zygocera barbicornis, *Pascoe, ib.* ser. 2. v. p. 34; ser. 3. i. p. 544, pl. 22. f. 4.)
Hab. South Australia; New South Wales; Queensland.

DYSTHÆTA.

Dysthæta, *Pascoe, ib.* ser. 2. v. p. 31.

DYSTHÆTA ANOMALA, *Pascoe, ib.* p. 31, pl. 2. f. 6.
Hab. New South Wales; Queensland.

DORCADIONINÆ.

MICROTRAGUS.

Microtragus, (*White*) *Pascoe, Journ. of Entom.* ii. p. 360.

MICROTRAGUS ARACHNE, *Pascoe, ib.* ii. p. 361.
Hab. Western Australia.

M. STICTICUS, *Pascoe, antè,* p. 86.
Hab. ——?

M. SENEX, *White, Stokes's Discoveries in Australia,* i. p. 511, pl. 2. f. 7.
Hab. ——?

M. EREMITA, *Pascoe, Journ. of Entom.* ii. p. 342.
Hab. South Australia (The Murray).

M. MORMON, *Pascoe, ib.* ii. p. 161.
Hab. South Australia (The Murray).

M. WATERHOUSEI, *Pascoe, ib.* p. 229.
Hab. Kangaroo Island.

M. AMYCTEROIDES, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 61.
Hab. Queensland.

ATHEMISTUS.

Athemistus, *Pascoe, ib.* ser. 2. v. p. 49.

ATHEMISTUS RUGOSULUS. (Lamia rugosula, *Guérin, Voy. de la Coq.* ii. p. 134, pl. 7. f. 9.)
Hab. New South Wales.

A. PUBESCENS, *Pascoe, Journ. of Entom.* i. p. 352.
Hab. Victoria.

A. ARMITAGEI, *Pascoe, antè,* p. 87.
Hab. New South Wales.

A. FUNEREUS, *Pascoe, antè,* p. 87.
Hab. New South Wales.

CERÆGIDION.

Ceregidion, *Boisduval, Voy. de l'Astrol.* (1835) p. 492; *Mag. de Zool.* 1835.

CERÆGIDION HORRENS, *Boisd. Voy. de l'Astr.* p. 493; *Mag. de Zool.* 1835, pl. 127.
Hab. Australia (north coast).

MESOLITA.

Mesolita, *Pascoe, Journ. of Entom.* i. p. 362.

MESOLITA TRANSVERSA, *Pascoe, ib.* p. 363, pl. 17. f. 7.
Hab. Queensland.

M. LINEOLATA, *Pascoe, ib.*
Hab. Queensland.

APOMECYNINÆ.

APOMECYNA.

Apomecyna, *Serville, Ann. Soc. Ent. de France,* iv. p. 77.

APOMECYNA HISTRIO. (?Lamia histrio, *Fabricius, Ent. Syst.* ii. p. 288.)
Hab. Australia (north).

A. NIGRITA, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 49.
Hab. Australia (North).

HATHLIODES.

Hathliodes, *Pascoe, antè,* p. 88.
Mycerinus, *J. Thomson* (in pt.).
Hathlia, *Dejean* (in pt.).

HATHLIODES GRAMMICUS. (Mycerinus grammicus, *Pascoe, Trans. Ent. Soc.* ser. 2. p. 49.)
Hab. Australia (interior towards the north).

H. MORATUS, *Pascoe, antè,* p. 89.
Hab. Australia (North).

H. MURINUS. (Hathlia murina, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 50.)
Hab. Australia (interior towards the north).

H. ARIDUS. (Mycerinus aridus, *Pascoe, Ann. & Mag. Nat. Hist.* ser. 3. ix. p. 466. Mycerinopsis arida, *Thomson, Syst. Ceramb.* p. 50.)
Hab. Lizard Island.

H. UNIFORMIS. (Mycerinus uniformis, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 546).
Hab. Port Curtis.

H. QUADRILINEATUS. (Hathlia quadrilineata, *Hope, Ann. & Mag. Nat. Hist.* 1842, ix. p. 429.)
Hab. Port Essington; Port Curtis; South Australia (Gawler).

H. LACTEOLUS. (Hathlia lacteola, *Hope, ib.* p. 429.)
Hab. Port Essington.

H. MELANOCEPHALUS. (Hathlia melanocephala, *Hope, ib.* p. 430. H. gracilis, *Voy. au Pôle Sud,* iv. p. 301, pl. 17. f. 18.)
Hab. Port Essington; Raffles Bay.

H. LINEELLUS. (Hathlia lineella, *Hope, ib.* p. 430.)
Hab. Port Essington.

LYCHROSIS.

Lychrosis, *Pascoe, antè,* p. 89.

LYCHROSIS LUCTUOSUS. (Mycerinus luctuosus, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 546, pl. 22. f. 5.)
Hab. Port Curtis.

PHÆAPATE.

Phæapate, *Pascoe, Journ. of Entom.* ii. p. 363.

PHÆAPATE ALBULA, *Pascoe, ib.* p. 363.
Hab. Queensland.

PRAONETHA.

Praonetha, *Blanchard* (scrip. *Prioneta*), *Voy. au Pôle Sud,* iv. p. 272
Pterolophia, *Newman, Entom.* p. 370.
Notolophia, *Brit. Mus.*

PRAONETHA DISPERSA. (Notolophia dispersa *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 47.)
Hab. Australia (north coast).

P. PLEURICAUSTA, *Pascoe, antè,* p. 89.
Hab. Port Albany.

SYBRA.

Sybra, *Pascoe, Trans. Ent. Soc.* ser. 3. iv. p. 198.

SYBRA INCIVILIS. (Ropica incivilis, *Pascoe, ib.* i. p. 546.)
Hab. Port Curtis.

S. ACUTA. (Ropica geminata, *Pascoe, ib.* p. 547, non *Klug.*)
Hab. New South Wales.

S. CENTURIO, *Pascoe, antè,* p. 90.
Hab. Sydney.

ROPICA.

Ropica, *Pascoe, Trans. Ent. Soc.* ser. 2. iv. p. 247.

ROPICA EXOCENTROIDES. (Sybra exocentroides, *Pascoe, ib.* v. p. 61.)
Hab. Queensland.

ATIMURA.

Atimura, *Pascoe, ib.* ser. 3. i. p. 548.
ATIMURA TERMINATA, *Pascoe, ib.* pl. 23. f. 6.
Hab. Port Curtis.

ITHEUM.

Itheum, *Pascoe, Journ. of Entom.* ii. p. 230.

ITHEUM VITTIGERUM, *Pascoe, ib.*, pl. 11. f. 9.
Hab. South Australia.

I. LINEARE, *Pascoe, ib.*
Hab. South Australia (Adelaide, Port Lincoln).

GENUS NOVUM.

Gen. nov. LEPIDA. (Anæsthetis lepida, *Germar, Linn. Ent.* iii. p. 228.)
Hab. South Australia.

ZYGRITA.

Zygrita, *J. Thomson, Essai, &c.* p. 69.
Cylindrodema, *Cat. name.*

ZYGRITA DIVA, *Thomson, ib.* p. 69. (Zygrita nigro-zonata, var., *ejusd.*) *ib.*
Hab. New South Wales; Queensland.

HIPPOPSINÆ.

ESSISUS.

Essisus, *Pascoe, antè*, p. 90.

ESSISUS DISPAR, *Pascoe, antè*, p. 91.
Hab. Queensland.

TMESISTERNINÆ.

ANASTETHA.

Anastetha, *Pascoe, Proc. Ent. Soc.* Sept. 1866.

ANASTETHA RARIPILA, *Pascoe, ib.*
Hab. Rockhampton.

TEMNOSTERNUS.

Temnosternus, *White, Cat. Long. Brit. Mus.* p. 335.

TEMNOSTERNUS PLANIUSCULUS, *White, ib.*, pl. 8. f. 6.
Hab. Queensland.

TEMNOSTERNUS DISSIMILIS, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 59.
Hab. Queensland.

CERAMBYCIDÆ.

STENODERINÆ.

BIMIA.

Bimia, *White, Proc. Zool. Soc.* 1850, p. 13.

BIMIA BICOLOR, *White, ib.*, pl. 13. f. 2.
Hab. Queensland; New South Wales; Victoria; South Australia Western Australia.

B. FEMORALIS, *W. Wilson Saunders, Trans. Ent. Soc.* ser. 2. i. p. 32, pl. 4. f. 7.
Hab. ——?

ACIPTERA.

Akiptera, *W. W. Saunders, ib.* p. 82.

ACIPTERA SEMIFLAVA, *W. W. Saunders, ib.* p. 83, pl. 4. f. 6.
Hab. ——?

A. WATERHOUSEI, *Pascoe, Journ. of Entom.* ii. p. 239, pl. 11. f. 4.
Hab. South Australia.

AGAPETE.

Agapete, *Newman, Zoologist,* iii. p. 1017 (1845).

AGAPETE CARISSIMA, *Newman, ib.*; *W. W. Saunders, Trans. Ent. Soc.* ser. 2. i. p. 84, pl. 1. f. 2.
Hab. Victoria; New South Wales; South Australia.

A. KREUSLERÆ, *Pascoe, Journ. of Entom.* ii. p. 241.
Hab. South Australia (Gawler).

A. VESTITA, *Pascoe, antè,* p. 91.
Hab. South Australia (Gawler).

EARINIS.

Earinis, *Pascoe, Journ. of Entom.* ii. p. 240.

EARINIS MIMULA, *Pascoe, ib.* p. 241, pl. 11. f. 3.
Hab. South Australia.

E. KREUSLERÆ, *Pascoe, antè,* p. 91.
Hab. South Australia.

EROSCHEMA.

Eroschema, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 17.
Octavia, *Thomson, Essai, &c.* p. 146.

EROSCHEMA POWERI, *Pascoe, ib.,* pl. 2. f. 2.
Hab. New South Wales; Victoria; South Australia; Western Australia.

E. ATRICOLLE, *Pascoe, Journ. of Entom.* ii. p. 365.
Hab. Western Australia.

CHAODALIS.

Chaodalis, *Pascoe, ib.* p. 366.

CHAODALIS MACLEAYI, *Pascoe, ib.* p. 367, pl. 16. f. 1.
Hab. New South Wales.

TROPIS.

Tropis, (*Newman*) *Pascoe, Tr. Ent. Soc.* ser. 3. i. p. 568 (1863).
Tropocalymma, *J. Thomson, Syst. Ceramb.* p. 138 (1864).

TROPIS OCULIFERA. (Rhagiomorpha oculifera, *Newman, Ann. Nat. Hist.* v. p. 21.)
Hab. Tasmania.

T. DIMIDIATA, *Newman, Entom.* p. 34. (Tropocalymma dimidiata, *Thomson, Syst. Ceramb.* p. 138.)
Hab. Queensland.

TRITOCOSMIA.

Tritocosmia, *Newman, Zoologist,* 1850, *App.* cxii.

TRITOCOSMIA ROEI. (Stenoderus Roei, *Hope, Trans. Ent. Soc.* ser. 1. i. p. 17, pl. 2. f. 3.)
Hab. Western Australia; New South Wales.

T. ATRICILLA, *Newman, Zool.* 1850, cxv. Var. of Roei?
Hab. —— ?

T. DIGGLESII, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 58.
Hab. Queensland.

T. RUBEA, *Pascoe, ib.* p. 24.
Hab. New South Wales.

T. PARADOXA, *Pascoe, ib.* p. 56.
Hab. Victoria; South Australia.

STENODERUS.

Stenoderus, *Serville, Ann. Soc. Ent. de France,* iv. p. 210.
Pterostenus, *Thomson, Essai, &c.* p. 149.

STENODERUS SUTURALIS. (Stenocorus suturalis, *Olivier, Entom.* iv. no. 69, pl. 3. f. 24. Cerambyx abbreviatus, *Fabricius, Ent. Syst.* ii. p. 275. Leptura ceramboides, *Kirby, Trans. Linn. Soc.* xii. p. 472. Stenoderus labiatus, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 24 (var.).)
Hab. Victoria; South Australia; New South Wales; Western Australia.

S. OSTRICILLA, *Newman, Zool.* 1850, cxiii.
Hab. Queensland.

S. MACULICORNIS, *W. W. Saunders, Trans. Ent. Soc.* ser. 2. i. p. 79, pl. 4. f. 2.
Hab. North coast.

S. QUIETUS, *Newman, Trans. Ent. Soc.* ser. 2. iv. p. 53.
Hab. Queensland.

S. CONCOLOR, *Macleay, King's Voy.* p. 452.
Hab. Victoria.

SYLLITUS.

Syllitus, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 24.

SYLLITUS GRAMMICUS. (Stenoderus grammicus, *Newman, Ann. Nat. Hist.* v. p. 21. Stenoderus rectus, *Newman, Entom.* p. 95 (var.).)
Hab. South Australia; Victoria; New South Wales; Western Australia.

S. PARRYI, *Pascoe, Journ. of Entom.* i. p. 366.
Hab. New South Wales?

S. DEUSTUS. (Stenoderus deustus, *Newman, Entom.* p. 95.)
Hab. ——?

APHNEOPE.

Aphneope, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 567.

APHNEOPE SERICATA, *Pascoe, ib.* p. 568, pl. 22. f. 1.
Hab. Port Curtis.

ZOËDIA.

Zoëdia, *Pascoe, Journ. of Entom.* i. p. 361.

ZOËDIA TRIANGULARIS, *Pascoe, ib.* p. 361, pl. 17. f. 3.
Hab. Victoria.

Z. DIVISA, *Pascoe, ib.* p. 362, pl. 17. f. 1.
Hab. Kangaroo Island; Victoria.

AMETROCEPHALA.

Ametrocephala, *Blanchard, Gay, Hist. Fis. de Chili,* v. p. 480.
Pseudocephalus, *Newman, Entom.* p. 553 (non *Burmeister*).

AMETROCEPHALA FORMICIDES. (Pseudocephalus formicides, *Newm. ib.* p. 353.)
Hab. Victoria.

A. ARIETINA. (Pseudocephalus arietinus, *Newman, Zool.* 1851, *Suppl.* cxxxvii.)
Hab. Tasmania.

A. MIRA, *Pascoe, Journ. of Ent.* ii. p. 367.
Hab. Western Australia.

TRICHEOPS.

Tricheops, *Newman, Entom. Mag.* v. p. 171.

TRICHEOPS EPHIPPIGER, *Newman, ib.* p. 171.
Hab. New South Wales.

MACRONES.

Macrones, *Newman, Entom.* p. 33.

MACRONES EXILIS, *Newman, ib.*; *W. W. Saunders, Trans. Ent. Soc.* ser. 2. i. p. 78, pl. 1. f. 6.
Hab. Tasmania; South Australia.

M. RUFUS, *W. W. Saunders, ib.* p. 78, pl. 1. f. 8.
Hab. Hunter's River.

M. ACICULARIS, *Pascoe, Journ. of Entom.* i. p. 368.
Hab. South Australia.

M. CAPITO, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 566.
Hab. New South Wales; Port Curtis.

ENCHOPTERA.

Enchoptera, *W. W. Saunders, Trans. Ent. Soc.* ser. 2. i. p. 76.

ENCHOPTERA APICALIS, *W. W. Saunders, ib.* p. 77, pl. 1. f. 7.
Hab. Tasmania.

E. NIGRICORNIS, *W. W. Saunders, ib.* p. 77, pl. 1. f. 5.
Hab. New South Wales.

PSILOMORPHA.

Psilomorpha, *W. W. Saunders, ib.* p. 80.

PSILOMORPHA TENUIPES, *W. W. Saunders, ib.* p. 81, pl. 4. f. 1.
Hab. ——?

P. APICALIS, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 58.
Hab. Queensland.

P. LUSORIA, *Pascoe, Journ. of Entom.* ii. p. 367. (? Stenoderus pulcher, *Hope, Trans. Ent. Soc.* ser. 1. i. p. 18.)
Hab. Queensland.

ORODERES.

Oroderes, *W. W. Saunders, Trans. Ent. Soc.* ser. 2. i. p. 81.

ORODERES HUMERALIS, *W. W. Saunders, ib.* p. 81, pl. 1. f. 3.
Hab. New South Wales; North Australia.

BRACHOPSIS.

Brachopsis, *W. W. Saunders, ib.* p. 97.

BRACHOPSIS CONCOLOR, *W. W. Saunders, ib.* p. 97, pl. 1. f. 4.
Hab. Tasmania.

B. NUPERA, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 565.
Hab. New South Wales.

STEPHANOPS.

Stephanops, *Shuckard, Entom. Mag.* v. p. 509.
Rhinophthalmus, *Thomson, Essai, &c.* p. 152.

STEPHANOPS NASUTUS, *Shuckard, Entom. Mag.* v. p. 510. (Macrones elongaticeps, *Blanchard, Voy. au Pôle Sud*, pl. 16. fig. 8.)
Hab. Tasmania; Victoria; South Australia; New South Wales; Queensland.

RHAGIOMORPHA.

Rhagiomorpha, *Newman, Ann. Nat. Hist.* v. p. 21.
Physodroma, *Thomson, Essai, &c.* p. 150.

RHAGIOMORPHA LEPTUROIDES. (Stenocorus lepturoides, *Boisduval, Voy. de l'Astrol.* p. 479. Physodroma sexcostata, *Thomson, Essai, &c.* p. 150.)
Hab. New South Wales.

TESSAROMMA.

Tessaromma, *Newman, Ann. Nat. Hist.* v. p. 20.
Meropachys, (*Macleay*) *Hope, Trans. Zool. Soc.* i. p. 197.

TESSAROMMA UNDATUM, *Newman, l. c.* (Meropachys Macleayi, *Hope, l. c.* Meropachys tristis, var. *ej. ib.* Callidium fulvomaculatum, *Blanch. Voy. au Pôle Sud.*)
Hab. South Australia; Victoria; New South Wales.

PHLYCTÆNODES.

Phlyctænodes, *Newman, Ann. Nat. Hist.* v. p. 20.
Trachelorachys, *Hope, Trans. Zool. Soc.* iii. p. 196.
Demacidia, *Thomson, Essai, &c.* p. 246.

PHLYCTÆNODES PUSTULOSUS, *Newman, l.c.* p. 20. (Trachelorachys fumicolor, *Hope, l.c.* p. 196. Demacidia brunnea, *Thomson, l.c.* p. 246.)
Hab. Tasmania.

P. PUSTULATUS. (Trachelorachys pustulata, *Hope, l.c.* p. 196.)
Hab. New South Wales.

P. PILOSUS, *Pascoe, Journ. of Entom.* ii. p. 234.
Hab. South Australia.

DIOTIMA.

Diotima, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 57.

DIOTIMA UNDULATA, *Pascoe, ib.* p. 58, pl. 2. f. 9.
Hab. Queensland; New South Wales.

APOSITES.

Aposites, *Pascoe, Journ. of Entom.* ii. p. 363.

APOSITES MACILENTUS, *Pascoe, ib.* p. 364, pl. 16. f. 6.
Hab. South Australia (Gawler).

A. PUBICOLLIS, *Pascoe, antè,* p. 92.
Hab. Western Australia.

BARDISTUS.

Bardistus, *Newman, Entom.* p. 80.

BARDISTUS CIBARIUS, *Newman, ib.* p. 80.
Hab. Western Australia.

NEOSTENUS.

Neostenus, *Pascoe, Trans. Ent. Soc.* ser. 2. iv. p. 91.
Lysestia (♀), *Pascoe, Journ. of Entom.* ii. p. 364.

NEOSTENUS SAUNDERSII, *Pascoe, Trans. Ent. Soc.* ser. 2. iv. p. 91, pl. 22. f. 2. (Lysestia rotundicollis, *Pascoe, Journ. of Entom.* ii. p. 365.
Hab. Victoria; South Australia.

N. MORIO. (Lysestia morio, *Pascoe, Journ. of Entom.* ii. p. 365.)
Hab. Western Australia.

MYSTROSA.

Mystrosa, *Pascoe, Journ. of Entom.* ii. p. 239.

MYSTROSA RUBIGINEA, *Pascoe, ib.*, pl. 11. f. 2.
Hab. South Australia.

URACANTHINÆ.

SCOLECOBROTUS.

Scolecobrotus, *Hope, Trans. Zool. Soc.* i. p. 109.

SCOLECOBROTUS WESTWOODII, *Hope, ib.*, pl. 15. f. 5.
Hab. South Australia; Western Australia.

URACANTHUS.

Uracanthus, *Hope, ib.* p. 108.

URACANTHUS TRIANGULARIS, *Hope, ib.*, pl. 15. f. 4. (Uracanthus angustatus, *Laporte, Hist. Nat. Ins.* ii. p. 425.)
Hab. Victoria; South Australia.

U. SIMULANS, *Pascoe, antè*, p. 92.
Hab. South Australia.

U. MARGINELLUS, *Hope, Trans. Zool. Soc.* iii. p. 198.
Hab. Western Australia.

U. BIVITTA, *Newman, Entom. Mag.* v. p. 172.
Hab. New South Wales; Queensland.

U. PALLENS, *Hope, Trans. Zool. Soc* iii. p. 198.
Hab. Tasmania.

U. FUSCO-CINEREUS, *White, Cat. Long. Brit. Mus.* p. 330.
Hab. New South Wales.

U. MINIATUS, *Pascoe, antè*, p. 93.
Hab. Western Australia.

ÆTHIORA.

Æthiora, *Pascoe, Journ. of Entom.* ii. p. 369.

ÆTHIORA FULIGINEA. (Uracanthus fuligineus, *Pascoe, ib.* p. 238.)
Hab. South Australia.

TRICHOMESIA.

Trichomesia, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 18.

TRICHOMESIA NEWMANII, *Pascoe, ib.* p. 18.
Hab. New South Wales; Victoria; South Australia.

DISTICHOCERINÆ.

DISTICHOCERA.

Distichocera, *Kirby, Trans. Linn. Soc.* xii. p. 471.

DISTICHOCERA MACULICOLLIS, *Kirby, ib.* t. 28. f. 10. (D. rubripennis, *MacLeay*, ♀. D. ferruginea, *Guérin*, ♀. D. fulvipennis, *Newman*, ♀.)
Hab. New South Wales; Victoria.

D. MUTATOR, *Pascoe, Journ. of Entom.* i. p. 370.
Hab. Queensland.

D. PAR, *Newman, Proc. Zool. Soc.* 1851, p. 78. (Distichocerus fuliginosus, *Blanchard, Croch. Règne Animal*, pl. 66. f. 4.)
Hab. Victoria; South Australia.

D. THOMSONELLA, *White, Proc. Zool. Soc.* 1859, p. 122, pl. 58. f. 6.
Hab. Victoria; New South Wales; North Australia; South Australia.

D. KIRBYI, *Newman, ib.* 1851, p. 79, pl. 20.
Hab. New South Wales.

D. MACLEAYI, *Newman, ib.* 1851, p. 81.
Hab. New South Wales; Victoria; South Australia.

TRAGOCERINÆ.

TRAGOCERUS.

Tragocerus, *Serville, Ann. Soc. Ent. de France*, iii. p. 60.

TRAGOCERUS BIDENTATUS. (Prionus bidentatus, *Donovan, Ins. New Holl.* f. Tragocerus australis, *Serville, Ann. Soc. Ent. de France*, iii. p. 61.)
Hab. New South Wales; Victoria.

T. FASCIATUS. (Prionus fasciatus, *Donovan, Ins. New Holl.* f. Tragocerus australis, *Boisduval, Voy. de l'Astrol.* p. 465, pl. 8. f. 6. T. bifasciatus, *Guér. Voy. de la Coq.* pl. 7. f. 3.)
Hab. New South Wales; Victoria.

T. SUBFASCIATUS, Germar, Linn. Ent. iii. p. 224.
Hab. South Australia; Victoria.

T. SPENCEI, *Hope, Trans. Ent. Soc.* i. p. 18, pl. 2. f. 4.
Hab. Victoria; New South Wales; South Australia.

T. FORMOSUS, *Pascoe, Ann. & Mag. Nat. Hist.* ser. 3. ix. p. 463.
Hab. Lizard Island.

T. LEPIDOPTERUS. (Prionus lepidopterus, *Schrebers, Trans. Linn. Soc.* vi. p. 197, t. 21. f. 7.)
Hab. New South Wales.

PYTHEINÆ.

TELOCERA.

Telocera, *White, Ann. & Mag. Nat. Hist.* ser. 3. ii. p. 354.

TELOCERA WOLLASTONI, *White, ib.* p. 355.
Hab. Queensland.

PYTHEUS.

Pytheus, *Newman, Entom.* p. 14.

PYTHEUS JUGOSUS, *Newman, ib.* p. 14.
Hab. New South Wales.

P. LATEBROSUS, *Newman, ib.* p. 95.
Hab. Kangaroo Island; South Australia; New South Wales.

P. PULCHERRIMUS. (Brachytria pulcherrima, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 28.)
Hab. Queensland; South Australia.

BRACHYTRIA.

Brachytria, *Newman, Ann. & Mag. Nat. Hist.* v. p. 16.

BRACHYTRIA GULOSA, *Newman, ib.* p. 16; *W. Wilson Saunders, Trans. Ent. Soc.* ser. 2. i. pl. 4. f. 3. (Callidiomorphus depressus, *Blanchard, Voy. au Pôle Sud,* pl. 17. f. 3.)
Hab. Tasmania; Victoria; New South Wales; South Australia; Queensland.

B. CENTRALIS, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 564.
Hab. South Australia.

OMOPHŒNA.

Omophœna, *Pascoe, Journ. of Entom.* ii. p. 230.

OMOPHŒNA KREUSLERÆ, *Pascoe, ib.* p. 231, pl. 11. f. 8.
Hab. South Australia.

O. TÆNIATA, *Pascoe, antè,* p. 93.
Hab. ——?

EBUROPHORA.

Eburophora, *White, Cat. Long. Brit. Mus.* p. 332.

EBUROPHORA OCTOGUTTATA, *White, ib.*, pl. 8. f. 7.
Hab. Victoria.

PEMPSAMACRA.

Pempsamacra, *Newman, Entom. Mag.* v. p. 495.

PEMPSAMACRA DISPERSA, *Newman, ib.* p. 495. (Callidium fulvo-maculatum, *Blanchard, Voy. au Pôle Sud,* iv. p. 273, t. 16. f. 8.)
Hab. Victoria; South Australia; New South Wales; Queensland.

P. TILLIDES, *Newman, ib.* p. 496.
Hab. New South Wales.

P. VESTITA, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 57.
Hab. Victoria.

P. SUBAUREA, *Pascoe, ib.* ser. 3. i. p. 564.
Hab. New South Wales.

P. PYGMÆA, *Newman, Zool.* 1851, cxxviii. (Lepidisia bimaculata, *White, Cat. Long. Brit. Mus.* p. 333, pl. 8. f. 9.)
Hab. Victoria; New South Wales; Queensland.

HESTHESINÆ.

HESTHESIS.

Hesthesis, *Newman, Ann. Nat. Hist.* v. p. 17.

HESTHESIS FERRUGINEUS. (Molorchus ferrugineus, *Boisduval, Voy. de l'Astrol.* p. 487.)
Hab. New South Wales; Queensland.

H. CINGULATUS. (Molorchus cingulatus, *Kirby, Trans. Linn. Soc.* xii. p. 472.)
Hab. Victoria; New South Wales; South Australia.

H. MŒRENS, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 21.
Hab. New South Wales.

H. MURINUS, *Pascoe, ib.* ser. 3. i. p. 555.
Hab. New South Wales; Western Australia.

H. PLORATOR, *Pascoe, Journ. of Entom.* i. p. 369.
Hab. Victoria.

H. VARIEGATUS. (Leptura variegata, *Fabricius, Mant. Ins.* i. p. 108. Molorchus variegatus, *Fabricius, Ent. Syst.* ii. p. 357.)
Hab. New South Wales.

H. ORNATUS, *W. Wilson Saunders, Trans. Ent. Soc.* ser. 2. i. p. 84, pl. 1. f. 1.
Hab. New South Wales.

H. BIZONATUS, *Newman, Ann. Nat. Hist.* v. p. 17.
Hab. ——?

H. VESPARIUS, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 557.
Hab. ——?

H. VIGILANS, *Pascoe, ib.* p. 556.
Hab. Victoria; New South Wales.

H. ACUTIPENNIS, *Pascoe, ib.* p. 556.
Hab. New South Wales.

H. ANGUSTATUS, *Pascoe, ib.* p. 554.
Hab. Western Australia.

OBRIINÆ.

IGENIA.

Igenia, *Pascoe, antè*, p. 95.

IGENIA IBIDIONOIDES. (Obrium ibidionoides, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 26.)
Hab. New South Wales.

I. STIGMOSA, *Pascoe, antè*, p. 95.
Hab. South Australia.

I. DORSALIS. (Obrium dorsale, *Pascoe, Journ. of Entom.* ii. p. 237.)
Hab. South Australia.

SIDIS.

Sidis, *Pascoe, antè*, p. 93.

SIDIS OPILOIDES, *Pascoe, antè*, 94.
Hab. South Australia (Gawler).

ACYRUSA.

Acyrusa, *Pascoe, antè*, p. 94.

ACYRUSA CILIATA. (Obrium ciliatum, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 559.)
Hab. New South Wales.

PHALOTA.

Phalota, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 559.

PHALOTA TENELLA, *Pascoe, ib.* p. 560.
Hab. Port Curtis.

P. COLLARIS, *Pascoe, antè*, p. 96.
Hab. South Australia (Gawler).

XYSTŒNA.

Xystœna, *Pascoe, antè*, p. 96.

XYSTŒNA VITTATA, *Pascoe, antè*, p. 97.
Hab. Queensland.

SISYRIUM.

Sisyrium, *Pascoe, antè*, p. 95.

SISYRIUM TRIPARTITUM. (Obrium tripartitum, *Pascoe, Journ. of Entom.* ii. p. 238.)
Hab. South Australia.

MECYNOPUS.

Mecynopus, *Erichson, Wiegmann's Archiv*, 1842, p. 222.

MECYNOPUS COTHURNATUS, *Erichson, ib.*, t. 4. f. 10.
Hab. Tasmania.

M. SEMIVITREUS, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 56.
Hab. Victoria.

OMOTES.

Omotes, *Newman, Entom.* p. 353.

OMOTES CUCUJIDES, *Newman, ib.*
Hab. Victoria.

O. PUNCTISSIMA, *Newman, Zool.* 1851, cxxix.
Hab. South Australia.

C. EROSICOLLIS, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 57.
Hab. Victoria.

CERAMBYCINÆ.

BETHELIUM.

Bethelium, *Pascoe, antè,* p. 97.

BETHELIUM SIGNIFERUM. (Callidium signiferum, *Newman, Entom.* p. 10.)
Hab. Tasmania.

B. INSCRIPTUM. (Callidium inscriptum, *Pascoe, Journ. of Entom.* i. p. 363.)
Hab. Queensland.

ELETE.

Elete, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 553.

ELETE INSCRIPTA, *Pascoe, ib.* p. 554, pl. 22. f. 2.
Hab. New South Wales.

SCELETODES.

Skeletodes, *Newman, Zool.* 1850, cxiii.

SCELETODES TETROPS, *Newman, ib.*
Hab. ——?

AMPHIROË.

Amphiroë, *Newman, Entom.* p. 24.

AMPHIROË DECORA, *Newman, ib.*
Hab. Queensland; Tasmania; South Australia.

CALLIDIOPSIS.

Callidiopsis, *J. Thomson, Syst. Ceramb.* p. 237.

CALLIDIOPSIS SCUTELLARIS. (Callidium scutellare, *Fabricius, Syst. El.* ii. p. 338. C. piceum, *Newman, Entom.* p. 9.)
Hab. Victoria; Tasmania.

C. PRÆCOX. (Stenocorus præcox, *Erichson, Wiegmann's Arch.* 1842, p. 220.)
Hab. Tasmania.

ATESTA.

Atesta, *Pascoe, antè*, p. 99.

ATESTA BIFASCIATA. (Phoracantha bifasciata, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 552.)
Hab. Port Curtis.

A. BALTEATA. (Phoracantha balteata, *Pascoe, Journ. of Entom.* ii. p. 233.)
Hab. South Australia.

A. ANGASII. (Phoracantha Angasii, *Pascoe, ib.* p. 233.)
Hab. South Australia.

ALLOTISIS.

Allotisis, *Pascoe, antè*, p. 99.

ALLOTISIS UNIFASCIATA. (Coptocercus unifasciatus, *Hope, Trans. Zool. Soc.* iii. p. 195, pl. 12. f. 6.)
Hab. Western Australia.

A. SCITULA, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 551.
Hab. Port Denison.

A. DISCRETA, *Pascoe, ib.* p. 551.
Hab. New South Wales.

EPITHORA.

Epithora, *Pascoe, antè*, p. 98.

EPITHORA DORSALIS. (Stenochorus dorsalis, *Macleay, App. King's Voyage*, ii. p. 451. S. uniguttatus, *Hope, Trans. Zool. Soc.* iii. p. 193. S. rhombifer, *Hope, ib.* p. 194. Mallocera elongata, *Laporte, Hist. Nat. des An. Art.* ii. p. 424. ? Stenochorus angustatus, *Boisduval.*)
Hab. Victoria; New South Wales.

CALLIRHOË.

Callirhoë, *Newman, Entom.* p. 3.

CALLIRHOË BIGUTTATA. (Stenocorus biguttatus, *Donovan, Ins. New Holl.* Coptocercus biguttatus, *Hope, Trans. Zool. Soc.* iii. p. 195, pl. 12. f. 7.)
Hab. Victoria; New South Wales; Queensland.

C. ALLAPSA. (Phoracantha allapsa, *Newman, Entom.* p. 4; *Blanchard, Voy. au Pôle Sud*, pl. 16. f. 3. Stenochorus Roei, *Hope, Trans. Zool. Soc.* iii. p. 194. S. rubripes, *Boisduval, Voy. de l'Astrol.* p. 447.)
Hab. Tasmania; South Australia; Victoria; Western Australia; New South Wales; Queensland.

C. ABERRANS. (Phoracantha aberrans, *Newman, Entom.* p. 4.)
Hab. New South Wales; Queensland.

C. POLITA. (Phoracantha polita, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 550.)
Hab. New South Wales.

C. PEDATOR. (Phoracantha pedator, *Pascoe, Journ. of Entom.* ii. p. 232.)
Hab. South Australia.

C. PUBESCENS. (Phoracantha pubescens, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 550.)
Hab. Port Curtis.

PHORACANTHA.

Phoracantha, *Newman, Ann. & Mag. Nat. Hist.* v. p. 19.
Stenochorus, *Hope, Trans. Zool. Soc.* iii. p. 190.
Stenocorus, *Fabricius* (in pt.), *Syst. Entom.* p. 178 (1775) non *Geoffroy* (1762).

PHORACANTHA SEMIPUNCTATA. (Stenocorus semipunctatus, *Fabricius, Syst. Entom.* p. 180. Cerambyx semipunctatus, *Olivier, Ins.* no. 67. p. 38, no. 69. pl. 2. f. 19. Stenocorus inscriptus, *Germar, Lin. Entom.* iii. p. 226.)
Hab. Victoria; New South Wales; South Australia; Western Australia.

P. RECURVA, *Newman, Entom.* p. 4. (Stenochorus semipunctatus, *Boisduval, Voy. de l'Astrol.* p. 476.)
Hab. South Australia; Victoria; New South Wales.

P. PUNCTATA. (Stenocorus punctatus, *Kirby, Trans. Linn. Soc.* xii. p. 470.)
Hab. New South Wales; South Australia; Western Australia.

P. LONGIPENNIS. (Stenochorus longipennis, *Hope, Trans. Zool. Soc.* iii. p. 190.)
Hab. Tasmania.

P. TRICUSPIS, *Newman, Entom.* p. 3. (Stenocorus robustus, *Germar, Lin. Entom.* iii. p. 225. ? P. impavida, *Newman, Zool.* 1850, cxiv.)
Hab. New South Wales; South Australia; Victoria.

P. GIGAS, *Hope, ib.* pl. 12. f. 5.
Hab. ? Western Australia.

P. QUINARIA, *Newman, Entom.* p. 3.
Hab. South Australia; Victoria.

P. FALLAX, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 549.
Hab. New South Wales; South Australia; Western Australia.

P. FLAVO-PICTA, *Pascoe, Journ. of Entom.* ii. p. 371.
Hab. South Australia.

P. TRIMACULATA. (Stenochorus trimaculatus, *Hope, Trans. Zool. Soc.* iii. p. 191, pl. 12. f. 9.)
Hab. Western Australia.

P. HOSPITA, *Pascoe, l. c.* p. 232.
Hab. Queensland.

P. SENIO, *Newman, Entom.* p. 4.
Hab. Victoria; South Australia; New South Wales.

DIOSPIDES.

Diospides, *Pascoe, antè,* p. 99.

DIOSPIDES OBSCURA. (Stenocorus obscurus, *Donovan, Ins. New Holl.*)
Hab. New South Wales; Queensland.

TRYPHOCHARIA.

Tryphocaria, *Pascoe, antè,* p. 99.

TRYPHOCHARIA HAMATA. (Phoracantha hamata, *Newman, Entom.* p. 3.)
Hab. New South Wales; Victoria.

T. SUPERANS. (Phoracantha superans, *Pascoe, Journ. of Entom.* i. p. 357.)
Hab. Tasmania.

T. MITCHELLI. (Stenochorus Mitchelli, *Hope, Trans. Zool. Soc.* iii. p. 191, pl. 12. f. 8.)
Hab. Western Australia.

T. ODEWAHNII. (Phoracantha Odewahnii, *Pascoe, Journ. of Entom.* ii. p. 231.)
Hab. South Australia.

XYPETA.

Xypeta, *Pascoe, antè,* p. 100.

XYPETA GRALLARIA. (Phoracantha grallaria, *Pascoe, l. c.* ii. p. 231.)
Hab. Queensland.

ÆSIOTYCHE.

Æsiotyche, *Pascoe, ib.* p. 370.

ÆSIOTYCHE FAVOSA, *Pascoe, ib.*, pl. 16. f. 3.

Hab. South Australia (Gawler).

CERAMBYX.

Cerambyx, *Linnæus, Syst. Nat.* ed. 12. t. i. pt. 11. p. 261.
Hammaticherus, *Dejean*; *non* Hamaticherus, *Serville.*
Pachydissus, *Newman, Ent. Mag.* v. p. 494.

CERAMBYX SERICUS. (Pachydissus sericus, *Newman, ib.* v. p. 494. Hammaticherus turbinaticornis, *Germar, Lin. Ent.* iii. p. 224.)
Hab. Victoria; South Australia; New South Wales; Western Australia.

C. PICIPENNIS. (Hammaticherus picipennis, *Germar, ib.* p. 225.)
Hab. South Australia.

C. NUBILUS, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 558.
Hab. Queensland.

DIDYMOCANTHA.

Didymocantha, *Newman, Ann. Nat. Hist.* v. p. 20.

DIDYMOCANTHA OBLIQUA, *Newman, ib.* p. 20. (Strongylurus varicornis, *Hope, Trans. Zool. Soc.* iii. p. 199.)
Hab. New South Wales; Queensland.

D. BREVICOLLIS, *Pascoe, antè,* p. 100.
Hab. Western Australia.

STRONGYLURUS.

Strongylurus, *Hope, l.c.* p. 199 (in pt.).
Isalium, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 549.

STRONGYLURUS SCUTELLATUS, *Hope, Proc. Zool. Soc.* 1840, p. 54; *Trans. Zool. Soc.* iii. p. 199, pl. 12. f. 2.
Hab. Victoria.

S. CRETIFER. (Coptopterus cretifer, *Hope, Trans. Zool. Soc.* iii. p. 200, pl. 12. f. 3. Isalium Odewahnii, *Pascoe, Journ. of Entom.* ii. p. 235, var.)
Hab. South Australia; Western Australia.

S. THORACICUS. (Didymocantha thoracica, *Pascoe, Trans. Ent. Soc.* ser. 2. iv. p. 98.
Hab. Queensland; New South Wales.

OXYMAGIS.

Oxymagis, *Pascoe, antè,* p. 101.

OXYMAGIS GRAYII, *Pascoe, ib.*
Hab. ——?

EXÆRETA.

Exæreta, *Pascoe, Journ. of Entom.* ii. p. 368.

EXÆRETA UNICOLOR, *Pascoe, ib.* p. 369, pl. 16. f. 2.
Hab. South Australia (Gawler).

LYGESIS.

Lygesis, *Pascoe, ib.* p. 369.

LYGESIS CYLINDRICOLLIS. (Didymocantha cylindricollis, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 18.)
Hab. Queensland.

BEBIUS.

Bebius, *Pascoe, Journ. of Entom.* ii. p. 369.

BEBIUS FILIFORMIS, *Pascoe, ib.* p. 370.
Hab. South Australia.

PETALODES.

Petalodes, *Newman, Entom.* p. 9.

PETALODES LAMINATUS, *Newman, ib.* p. 9.
Hab. South Australia; Victoria.

P. PLAGIATUS, *White, Ann. & Mag. Nat. Hist.* ser. 3. ii. p. 354, note.
Hab. ? South Australia.

OPSIDOTA.

Opsidota, *Pascoe, Journ. of Entom.* ii. p. 235.

OPSIDOTA INFECTA, *Pascoe, ib.* p. 236, pl. 11. f. 6.
Hab. South Australia.

O. ALBIPILOSA, *Pascoe, antè,* p. 101.
Hab. South Australia.

PIESARTHRIUS.

Piesarthrius, *Hope, Trans. Zool. Soc.* iii. p. 200.

PIESARTHRIUS MARGINELLUS, *Hope, ib.* iii. p. 200, pl. 12. f. 1.
Hab. Western Australia; Victoria.

CERESIUM.

Ceresium, *Newman, Entom.* p. 322.
Diatomocephala, *Blanchard, Voy. au Pôle Sud,* iv. p. 266.

CERESIUM SIMPLEX. (Stenochorus simplex, *Gyllenhall, in Schön. Syst. Ins. App.* i. 3. p. 178. Callidium vile, *Newman, Entom.* p. 223. Œmona Philippensis, *Newman, ib.* p. 247, fide *White.* Arhopalus ambiguus, *Newman, ib.* p. 246, fide *White.* Diatomocephala maculaticollis, *Blanchard, Voy. au Pôle Sud,* iv. p. 267, pl. 16. f. 9. D. simplex, *White, Cat. Long. Brit. Mus.* p. 305.)
Hab. ——? (Generally distributed from Burmah to the Philippine Islands; perhaps questionable as from Australia.)

PAPHORA.

Paphora, *Pascoe, antè,* p. 102.

PAPHORA MODESTA. (Ceresium? modestum, *Pascoe, Journ. of Entom.* ii. p. 237.)
Hab. South Australia.

PORITHEA.

Porithea, *Pascoe, antè,* p. 102.

PORITHEA INTORTA. (Callidium intortum, *Newman, Entom.* p. 223.)
Hab. ——?

APHANASIUM.

Aphanasium, *Thomson, Essai, &c.* p. 300.
Solimnia, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 557.

APHANASIUM AUSTRALE. (Callidium Australe, *Boisduval, Voy. de l'Astrol.* ii. p. 480; *Thomson, Essai, &c.* p. 300. Solimnia sublineata, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 558, pl. 22. f. 3.)
Hab. South Australia; New South Wales.

TAPHOS.

Taphos, *Pascoe, Journ. of Entom.* ii. p. 236.

TAPHOS ATERRIMUS, *Pascoe, ib.* pl. 11. f. 7.
Hab. South Australia.

IBIDIONINÆ.

ISCHNOTES.

Ischnotes, *Newman, Ann. Nat. Hist.* v. p. 18.

ISCHNOTES CYLINDRACEUS, *Newman, ib.* p. 18.
Hab. South Australia.

I. BAKEWELLII, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 56.
Hab. Victoria.

CLYTINÆ.

CLYTANTHUS.

Clytanthus, *Thomson, Syst. Ceramb.* p. 190.
Anthoboscus, *Chevrolat* (non *Guérin*).

CLYTANTHUS CURTISII. (Clytus Curtisii, *Laporte et Gory, Mon. du Genre Clytus*, p. 49, pl. 10. f. 56 bis.)
Hab. Queensland.

C. GLAUCINUS. (Clytus glaucinus, *Boisduval, Voy. de l'Astro.* ii. p. 483. *Laporte et Gory, Mon. Genre Clytus*, p. 98, pl. 18. f. 117.)
Hab. ——?

C. CHRYSODERES. (Clytus chrysoderes, *White, Cat. Long. Brit. Mus.* p. 285.)
Hab. Queensland.

C. ANNULARIS. (Callidium annulare, *Fabricius, Mant. Ins.* i. p. 156; *Ent. Syst.* ii. p. 337; *Olivier, Entom.* iv. no. 70. p. 48, pl. 6. f. 74.
Hab. "Port Jakson," fide *Boisduval.*

XYLOTRECHUS.

Xylotrechus, *Chevrolat, Ann. Soc. Ent. de France*, 1860, p. 456.

XYLOTRECHUS AUSTRALIS. (Clytus Australis, *Laporte et Gory, Mon. du Genre Clytus*, p. 99, pl. 19. f. 118.)
Hab. Queensland.

CREMYS.

Cremys, *Pascoe, Journ. of Entom.* ii. p. 246.

CREMYS DIOPHTHALMUS. (Clytus diophthalmus, *Pascoe, ib.* i. p. 358.)
Hab. Queensland.

ARIDÆUS.

Aridæus, *Thomson, Essai, &c.* p. 228.

ARIDÆUS THORACICUS. (Clytus thoracicus, *Donovan, Ins. of New Holl.*; *Laporte et Gory, Mon. du Genre Clytus*, p. 50, pl. 10, f. 58.)
Hab. New South Wales; Queensland.

A. HEROS, *Pascoe, antè*, p. 103.
Hab. Port Albany.

TYPHOCESIS.

Typhocesis, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 561.

TYPHOCESIS MACLEAYI, *Pascoe, ib.* p. 562, pl. 23. f. 4.
Hab. Port Denison; Rockhampton.

HEMISTHOCERA.

Hemisthocera, *Newman, Zool.* 1850, cxi.

HEMISTHOCERA FLAVILINEA, *Newman, ib.*; *White, Cat. Long. B. M.* pl. 6. f. 2.
Hab. Northern Australia.

OBRIDA.

Obrida, (*White*) *Pascoe, Journ. of Entom.* ii. p. 360 (note).

OBRIDA FASCIALIS. (Clytus (Obrida) fascialis, *White, Stoke's Discov. in Australia*, i. p. 510, pl. 2. f. 4.)
Hab. Victoria; New South Wales.

O. COMATA, *Pascoe, Journ. of Entom.* ii. p. 50.
Hab. Queensland.

HOMÆMOTA.

Homæmota, *Pascoe, ib.* p. 371.

HOMÆMOTA BASALIS, *Pascoe, ib.* p. 372.
Hab. Western Australia (Perth).

H. DUBOULAYI, *Pascoe, antè*, p. 103.
Hab. Western Australia.

TILLOMORPHA.

Tillomorpha, *Blanchard, in Gay, Hist. Fis. de Chili*, v. p. 482.

TILLOMORPHA MŒSTULA, *White, Cat. Long. Brit. Mus.* p. 290.
Hab. Queensland.

ECTOSTICTA.

Ectosticta, *Pascoe, antè*, p. 104.

ECTOSTICTA CLEROIDES. (Callidium cleroides, *White, Cat. Long. Brit. Mus.* p. 322. C. simillimum, *White, ib.* [var.?].)
Hab. Victoria; Western Australia; South Australia.

E. RUIDA, *Pascoe, antè*, p. 104.
Hab. Champion Bay.

E. EBURATA. (Callidium eburatum, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 563.)
Hab. New South Wales?

IPOMORIA.

Ipomoria, *Pascoe, antè*, p. 104.

IPOMORIA TILLIDES, *Pascoe, antè*, p. 105.
Hab. South Australia.

ADRIUM.

Adrium, *Pascoe, antè*, p. 105.

ADRIUM CATOXANTHUM. (Callidium catoxanthum, *White, Cat. Long. Brit. Mus.* p. 323.)
Hab. ——?

A. ARTIFEX. (Callidium artifex, *Newman, Entom.* p. 353. C. terebrans, *Newman, ib.* [var. ?]. C. cucujus, *White, l.c.* p. 323.)
Hab. South Australia; Victoria.

SOPHRON.

Sophron, *Newman, Entom.* p. 354.
Clæadne, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 560.

SOPHRON INORNATUS, *Newman, l.c.* p. 354. (Clæadne melanaria, *Pascoe, l.c.* p. 561, pl. 23. f. 5.)
Hab. New South Wales; South Australia; Victoria.

S. EBURATUS, *Pascoe, Journ. of Entom.* ii. p. 374.
Hab. South Australia.

CERASPHORINÆ.

PHACODES.

Phacodes, *Newman, Entom.* p. 7.

PHACODES OBSCURUS. (Callidium obscurum, *Fabricius, Ent. Syst.* i. pt. 11. p. 318; *Olivier, Coléopt.* iv. no. 70, pl. 4. f. 45. Phacodes lentiginosus, *Newman, l.c.* p. 7.)
Hab. Tasmania; New South Wales; Western Australia.

P. ESSINGTONI. (Callidium Essingtoni, *Hope, Ann. & Mag. Nat. Hist.* 1842, ix. p. 429.)
Hab. Port Essington.

P. PERSONATUS, *Erichson, Wiegmann's Arch.* 1842, p. 221.
Hab. Tasmania; New South Wales.

P. FERRUGINEUS, *Pascoe, Journ. of Entom.* ii. p. 238.
Hab. South Australia.

P. MOSSMANI, *Newman, Zool.* 1850, *App.* cxxiv.
Hab. South Australia.

P. ELUSUS, *Pascoe, Journ. of Entom.* ii. p. 373.
Hab. South Australia.

P. FUSCUS, *Pascoe, ib.* p. 373.
Hab. South Australia.

P. DISTINCTUS, *Pascoe*, *ib.* p. 373.
Hab. South Australia.

THERSALUS.

Thersalus, *Pascoe, ib.* p. 372.

THERSALUS BISPINUS. (Phacodes bispinus, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 562.)
Hab. ——?

ŒBARINA.

Œbarina, *Pascoe, antè,* p. 105.

ŒBARINA TRISTIS, *Pascoe, antè,* p. 106.
Hab. South Australia.

Œ. CERESIOIDES, *Pascoe, antè,* p. 106.
Hab. South Australia.

XYSTROCERA.

Xystrocera, *Serville, Ann. Soc. Ent. de France,* ii. p. 69.

XYSTROCERA VIRESCENS, *Newman, Ann. & Mag. Nat. Hist.* v. p. 19.
Hab. Victoria; South Australia.

X. AUSTRALASIÆ, *Hope, Ann. & Mag. Nat. Hist.* 1842, ix. p. 429.
Hab. Port Essington.

CALLICHROMINÆ.

CALLICHROMA.

Callichroma, *Latreille, Règ. An.* v. p. 113.

CALLICHROMA CINDERELLA, *White, Cat. Long. Brit. Mus.* p. 156.
Hab. North coast.

PURPURICENINÆ.

PURPURICENUS.

Purpuricenus, *Serville, Ann. Soc. Ent. de France,* ii. p. 568.
Cyclodera, *White, Stokes's Discoveries in Australia, App.* i. p. 510.

PURPURICENUS ANGASII. (Purpuricenus (Cyclodera), n. s., *White, Angas's South Australia Ill.* pl. 50. f. 17; *Cyclodera Angasii, White, Cat. Long. Brit. Mus.* p. 140. P. Australicus, *Thomson, Essai,* p. 203.)
Hab. New South Wales; South Australia.

P. QUADRINOTATUS. (Cyclodera quadrinotata, *White, Stokes's Discoveries in Australia*, i. p. 510, pl. 2. f. 6.)
Hab. Percy Islands; South Australia (Gawler); Queensland.

CALLIDIINÆ.

HYLOTRYPES.

Hylotrupes, (*Serville*) *Mulsant, Long. de Fr.* p. 55.

HYLOTRYPES ASEMOIDES. (Callidium asemoides, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 563.
Hab. South Australia.

PRIONIDÆ.

IOTHERIUM.

Iotherium, *Pascoe, ib.* p. 569.

IOTHERIUM METALLICUM. (Pœcilosoma metallicum, *Newman, Ent. Mag.* v. p. 493.)
Hab. Tasmania; Victoria; New South Wales.

PHAOLUS.

Phaolus, *Pascoe, Trans. Ent. Soc.* ser. 3. i. p. 569.

PHAOLUS MACLEAYI, *Pascoe, ib.* p. 569, pl. 23. f. 3.
Hab. New South Wales.

SCELEOCANTHA.

Sceleocantha, *Newman, Ann. Nat. Hist.* v. 14.

SCELEOCANTHA GLABRICOLLIS, *Newman, ib.* p. 15.
Hab. Tasmania.

S. PILOSICOLLIS. (Prionus pilosicollis, *Hope, Trans. Ent. Soc.* ser. 1. i. p. 16, pl. 11. f. 1.)
Hab. Western Australia.

TOXEUTES.

Toxeutes, *Newman, Ann. Nat. Hist.* v. p. 15 (1840).
Oncinotus, *Erichson, Wiegmann's Archiv*, 1842, p. 219.

TOXEUTES ARCUATUS. (Prionus arcuatus, *Fabricius, Syst. El.* ii. p. 259; *Olivier, Ent.* iv. p. 34. no. 66, pl. 10. f. 38.)
Hab. Tasmania.

RHIPIDOCERUS.

Rhipidocerus, *Westwood, Trans. Ent. Soc.* ser. 1. iii. p. 70.

RHIPIDOCERUS AUSTRALASIÆ, *Westwood, ib.*, pl. 3. f. 5.
Hab. —— ?

MACROTOMA.

Macrotoma, *Serville, Ann. Soc. Ent. de France*, i. p. 137.

MACROTOMA SPINICOLLIS. (Prionus spinicollis, *Macleay in King's Survey, App.* ii. p. 449. Mallodon Australis, *Boisd. Voy. de l'Astrol.* ii. p. 465.)
Hab. Clarence River.

M. GEMELLA, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 15.
Hab. New South Wales.

M. PAPYRIA, *Pascoe, Journ. of Entom.* ii. p. 244.
Hab. South (?) Australia.

M. AUSTRALIS, *Erichson, Wiegmann's Archiv,* 1842, p. 218.
Hab. Tasmania.

CATYPNES.

Catypnes, *Pascoe, Journ. of Entom.* ii. p. 243.

CATYPNES MACLEAYI, *Pascoe, ib.* p. 244.
Hab. Richmond River.

MALLODON.

Mallodon, *Serville, Ann. Soc. Ent. de France,* i. p. 137.

MALLODON INSULARE, *Hope, Ann. & Mag. Nat. Hist.* 1842, ix. p. 428.
Hab. Port Essington.

M. FIGURATUM, *Pascoe, Trans. Ent. Soc.* ser. 2. v. p. 14.
Hab. New South Wales.

M. STIGMOSUM, *Newman, Ann. Nat. Hist.* v. p. 15.
Hab. ——?

M. ODEWAHNII, *Pascoe, Journ. of Entom.* ii. p. 242.
Hab. South Australia.

M. CEPHALOTES, *Pascoe, ib.* p. 242.
Hab. Queensland.

M. EDULE. (Cnemoplites edulis, *Newman, Entom.* p. 351.)
Hab. Victoria.

M. JEJUNUM, *Pascoe, l.c.* p. 243.
Hab. Richmond River.

NOTOPHYSIS.

Notophysis, *Serville, Ann. Soc. Ent. de France,* i. p. 158.

NOTOPHYSIS LUCANOIDES, *Serville, ib.* p. 159.
Hab. South Australia (Gawler); Kangaroo Island.

The following is a list of doubtful species, either unknown to me, or probably erroneously enumerated as Australian; a few may be identical with some of the foregoing:—

MONOPLIA TETRA, *Newman, Zool.* iii. p. 1016 (1845).

ANCITA CROSSOTOIDES, *Thomson, Syst. Ceramb.* p. 64.

LAMIA PETRORHIZA, *Boisduval, Voy. de l'Astrol.* p. 502.

L. PICTA, *Leach, Zool. Misc.* i. p. 14, pl. 4 (? Rhytiphora).

MONOCHAMUS DESPERATUS, *Thomson, Arch. Ent.* i. p. 295.

M. TOGATUS, *Perroud, Ann. Soc. Linn. de Lyon,* n. s. ii. p. 341 (1856).

MORIMUS LUCTUOSUS, *Shuckard, Ent. Mag.* v. p. 510 (? Microtragus).

GNOMA GIRAFFA, *Schreibers* (Cerambyx), *Trans. Linn. Soc.* 1801, p. 198.

OLENECAMPTUS BILOBUS, *Fabricius* (Saperda), *Syst. Eleuth.* ii. p. 324.

XYLOTOLES GRISEA, *Fabricius* (Saperda), *Syst. Eleuth.* ii. p. 324.

OOPSIS NUTATOR, *Fabricius, Syst. El.* ii. p. 304 (Lamia).

ISOSCELES PIGRA, *Newman, Zool.* 1851, cxxxi.

COPTOMMA TEXTORIUM, *Newman, Ann. Nat. Hist.* v. p. 18.

C. VIRGATUM, *Newman, ib.* p. 18.

ENICODES FICHTELII, *Schrader* (Cerambyx), *Trans. Linn. Soc.* vi. p. 200.

GLAUCYTES GRAPHICUS, *Boisduval* (Leptocera), *Voy. de l'Astrol.* p. 611, pl. 9. f. 17.

LEPTOCERA VITTIFERA, *Buquet in Guérin, Icon. Ins.* p. 250.

RHAGIOMORPHA UNICOLOR, *Hope, Ann. Nat. Hist.* ix. p. 429.

R. PLAGIATA, *Hope, ib.*

R. SORDIDA, *Newman, Ann. Nat. Hist.* v. p. 21.

NECYDALIS AURICOMUS, *Newman, Ann. Nat. Hist.* v. p. 16.

HELIOMANES SIDUS, *Newman, ib.* p. 17.

CERAMBYX? LATIVITTA, *Newman, Zool.* 1850, cxv.

C.? SUBSERRATUS, *Newman, ib.* cxvi.

CALLIRHOË DECORA, *Perroud, Ann. Soc. Linn. de Lyon,* n. s. 1856, p. 371 (? biguttata, *Don.*).

COPTOCERCUS SEXMACULATUS, *Hope, Trans. Zool. Soc.* iii. p. 195.

PHORACANTHA GRACILIS, *Perroud, ib.* (? senio, *Newm.*).

P. IMBELLIS, *Newman, Entom.* p. 352 (? Epithora dorsalis, *MacL.*).

STENOCHORUS ACANTHOCERUS, *Hope, Trans. Zool. Soc.* iii. p. 193.

S. LATUS, *Hope, ib.* p. 190.

S. TUNICATUS, *Hope, ib.* p. 194.

S. UNDULATUS, *Hope, ib.* p. 192.

S. ASSIMILIS, *Hope, ib.* p. 193.

S. VICINUS, *Hope, Ann. Nat. Hist.* ix. p. 248.

S. CRUCIGER, *Hope, ib.*

PLOCÆDERUS AUSTRALASIÆ, *Hope, ib.*

CLYTUS SEX-MACULATUS, *Donovan, Ins. New Holl.* pl. 5. f.

C. ATTENUATUS, *Boisduval, Voy. de l'Astrol.* p. 485.

C. V-ALBUM, *Boisduval, ib.* pl. 9. f. 23 (?Zoedia).

CALLIDIUM EROSUM, *Macleay, King's Voy. App.* ii. p. 450.

C. FABER, *Newman, Ann. Nat. Hist.* v. p. 18.

C. AUSTRALE, *Boisduval, Voy. de l'Astrol.* ii. p. 480.

C. MOROSUM, *Boisduval, ib.* p. 480.

C. FUNESTUM, *Boisduval, ib.* p. 480.

C. FLAVOMACULATUM, *Blanchard, Voy. au Pôle Sud,* iv. p. 273, pl. 16. f. 8.

PHYMATODES* VARIABILIS, *Linnæus, Faun. Suecica,* 669, p. 192 (introduced).

HYLOTRYPES BAJULUS, *Linnæus, ib.* 672, p. 193 (introduced).

PITHANOTES FALSUS, *Newman, Ann. Nat. Hist.* v. p. 16 = ♀ Cacosceles Œdipus.

DORX PENTAMERA, *Newman, ib.* p. 16.

The following new genera and species of *Prionidæ* have been published by M. J. Thomson. They are unknown to me; but some of them may probably be identical with those enumerated in the List:—

ARIMASPES HOWEI, *Syst. Ceramb.* p. 302.

DIOCLIDES PRIONOIDES, *ib.* p. 303.

EURYNOSSA SERVILLEI, *ib.* p. 304.

TEISPES DORSALIS, *ib.* p. 305.

EXPLANATION OF THE PLATES.

TAB. III.

Fig. 1. *Allotisis discreta.*
2. *Oxymagis Grayii.*
3. *Igenia stigmosa.*
4. *Essisus dispar.*
5. *Zygocera pentheoides.*
6. *Neissa inconspicua.*
7. *Hathliodes grammicus.*
8. *Aposites pubicollis.*
9. *Microtragus sticticus.*

TAB. IV.

Fig. 1. *Ipomoria tillides.*
2. *Xypeta grallaria.*
3. *Sidis opiloides.*
4. *Sisyrium tripartitum.*
5. *Atesta bifasciata.*
6. *Paphora modesta.*
7. *Tryphocharia Odewahnii.*
8. *Xystæna vittata.*

[ERRATUM, *antè* p. 96, *line* 1, *after* former *read* except in its broad prothorax.]

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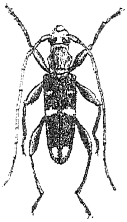
* The heteromerous genus *Phymatodes* of M. Blanchard was described some years after M. Mulsant had used the same word for the Longicorn genus. I have therefore to propose that M. Blanchard's name be changed to *Phymatestes.*

Linn. Soc. Journ. Zool. Vol. IX tab. 3.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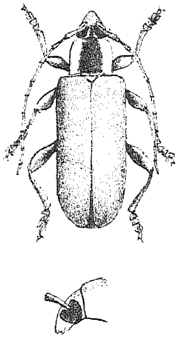
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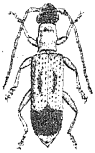
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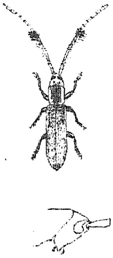
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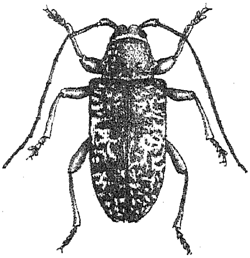
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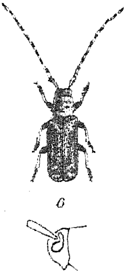
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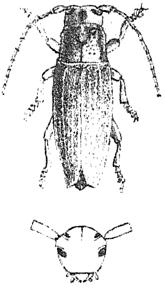
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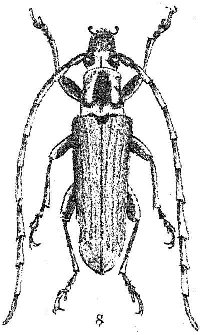
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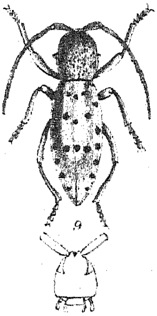
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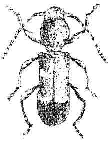
E. A. Smith del.

W. West imp.



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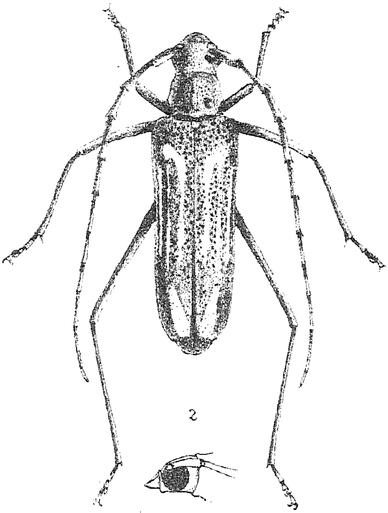

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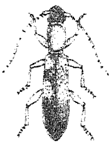

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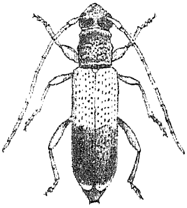

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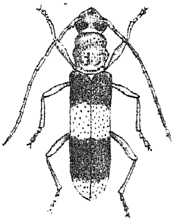

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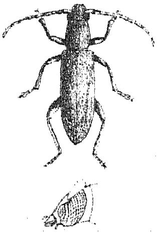

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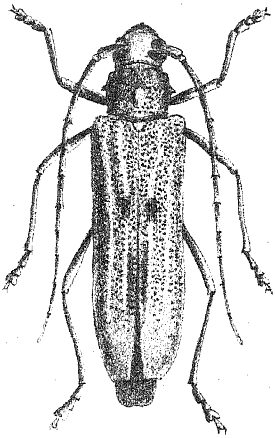

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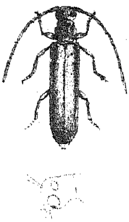

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E. A. Smith, del.

W. West, imp.

Stray Notes on some of the smaller Crustaceans. Note I. On the Habits &c. of the *Hyperiidæ*. By Thomas Edward, A.L.S.

[Read June 21, 1866.]

It would appear, from works on this department of the animal kingdom, that carcinologists are unanimously of opinion that the Hyperiidæ are parasitical in their habits. And in the most recent monograph on the subject we are told that the species are found to exist only in the gill-cavities of *Medusæ*, though they are also occasionally found on fish.

From this I in a great measure dissent. That some of the species are at times found in *Medusæ* I know. But is the *Medusa* their true habitat? I believe rather that, instead of being their natural abode, it is simply a place occasionally chosen for convenience' sake, or to suit existing circumstances as it were. But, since I have no wish to interfere with the ideas or researches of others, I shall in my remarks confine myself more particularly to what has come under my own observation.

Before discussing the habits of the species, I would here say a few words as to the sexes, so as to save time and useless repetition.

I consider the genus *Lestrigonus* of Milne-Edwards and subsequent writers to be nothing more nor less than the male of *Hyperia*. I am led to this conclusion from the remarkable similitude which exists among them, and from the fact that, in all the species (*five in number*) which I have met with, the sexes have always been associated, except in the case of *Lestrigonus Kinahani*. I have not, as yet, been able to detect a female for him, but have no doubt whatever of the others. It may here be mentioned that I speak only of those I have myself found. For my own part I have little or no difficulty whatever in tracing, almost from the ovary of the parent up to a state of maturity, *Lestrigonus exulans* as the male of *Hyperia galba*. The differences between the two are so slight as scarcely to be worth noticing, except perhaps in a sexual point of view. Their external appearance is almost the same, both in form and colour; and in habits they are wholly alike.

The same may be said of *H. olivia* and *H. medusarum*, the males of which have not yet been described, but both of which I have lately discovered, and which must, as a matter of course, be called *Lestrigonus*,—and also another species, believed to be new, and not yet named, and smaller than the last, which we shall here, but only for convenience' sake, as it is in the hands of another to name, call *H. minuta*. The males of all these, I say, can be clearly and satisfactorily defined; at least, so it appears to me. So confident am I in this, that those I have in my own collection are so arranged, and marked male and female.

The only species (as I have already said) to which I have not yet been able to assign a female is *L. Kinahani*. I thought I had discovered the desideratum once; but unhappily the specimens were lost before the examination and comparisons were completed.

Although this species may be, and is occasionally, found in company with *H. galba*, the one is easily distinguishable from the other. They are nothing alike, either in form or colour; not to speak of the long and remarkably slender antennæ of the one in comparison with those of the other. *H. Kinahani* is longish, more shrimp-like, especially behind, and not so round and dumpy as *H. galba*, and the colour is always much darker. The eyes, too, are dark instead of being of a light green. I am speaking of the living animal; for the figures which I have seen all appear to me to have been taken from rolled up and contracted specimens.

From these circumstances, then, we shall, for the present, lay aside the term *Lestrigonus*—except in the case of *L. Kinahani*, which must remain as he is in the meantime—and adopt that of *Hyperia*, and, when referring to the sexes, simply use the designation of *male* or *female* as occasion may require.

I have already said that it is the general belief amongst carcinologists that the animals composing this family are parasitical in their habits, and have never been found but on the *Medusa* and on fish.

This does not exactly agree with my experience; for I have taken all the five species mentioned swimming free. I do occasionally find *L. Kinahani* and *H. galba* in a *Medusa*, but have never as yet met with any of them attached to fish.

But, as already observed, is the *Medusa* or even a fish their real and true habitat? I rather think not; and my reason is this: they appear to me, although they do occasionally come inshore, to be what I would call an out- or deep-sea and a wandering genus. Now, from this circumstance, I believe that on coming in contact with the gill-cavities of the *Medusa*, and finding them a convenient and, perhaps, in some measure a comfortable receptacle, some may for a time avail themselves of the opportunity thus afforded of being carried through the water at the expense of another.

I am not yet certain whether the two species alluded to be animal feeders or not. If they are, as I know others of the family to be, then they may have two other objects in view in affixing themselves on the *Medusa*—one being shelter from their enemies (if they have any), and the other to obtain food. It is not at all impossible, but, as I think, rather probable, that other and much more minute animals, or something else congenial to their tastes, may exist in certain species of *Medusa*, and that these may attract and afford them abundant and savoury food. When in these retreats, I have frequently observed, with the aid of a glass, that their swimming-feet, as well as, sometimes, the others, but more particularly the former, were kept almost continually in motion. I could also occasionally see the mandibles and other appendages of the mouth moving. This was particularly the case with *H. galba*. From these circumstances I have been at times led to conclude that they were then in the act of feeding.

But whether I am right in these conjectures or not, I know that they can and do leave the *Medusa* at will, or when occasion suits them. I have often seen them do so, both in the water and on the land. In the latter case, and when the *Medusa* has been stranded for a little, they will come out, and, toppling over and over, roll hither and thither in the most awkward manner; for decidedly they can neither stand on their feet, nor walk, nor even crawl. But should they in thus tumbling headlong about again by chance reach their own element, they will then dart away like an arrow, seemingly taking no count as to the fate of the gelatinous friend that bore them to the shore. I have also taken them from the *Medusa*, and placed both in a pool, to see if they would again seek to enter. On these occasions a few of the smaller would do so; but the majority never did. They invariably kept swimming about without paying the least attention to the *Medusa*, and if an outlet could be found, off they went once more to sea. I have myself, when the tide was rising, cut channels in the sand to allow the water to run in instead of out, to see how they would then act. It was all one whether the water came in or went out; for whenever they got to the opening, away they sped. Not content with this, I have taken them home to try them there; but although the *Medusa* throve well enough for a time, the *Hyperia* never did; and, unlike the case of the rock-pools, under these circumstances I never saw any of them attempt to return to the *Medusæ*, but they kept continually swimming about, sometimes rolling themselves up, and in that position would fall to the bottom, where, having lain for a little, they would start up and begin swimming again.

I could never get either of these forms to eat, although I have kept them for that purpose, and with the view of ascertaining what their food might be. They in fact seldom rested long enough to allow of anything of the kind. *Lestrigonus Kinahani*, however, always appeared more docile, if I may use the phrase, and was never so restless as *H. galba*. Yet the whole aim of both, however large the vessel in which they were confined, seemed to be to regain their liberty and be once more in the free ocean. This being denied them they generally died in about two days, and sometimes sooner. I have placed various substances (in addition to marine productions), such as wood, cork, &c., in the vessel with them, but I never saw any of them pay the least attention or attach themselves to anything. A few once, but it was only for a little while, concealed themselves in the folds of a piece of paper; but that was the only instance of the kind I ever saw. Restless apparently in manners, though not quite so active and wild as some of their congeners, still their constant habit, as I have already hinted, was to swim about, with the additional trait of rolling themselves up occasionally like a ball, sinking to the bottom, where, after resting for a little, they would again stretch themselves out and resume their former occupation.

But although I have stated at some length the facts concerning the *Medusa* and some of its so-called parasites, I am not inferring whether they prove or disprove anything—that is, whether the *Hyperia* be parasitical or not. That the experiments, as will be observed, were in most cases made at what may be called a disadvantage to the animals, I freely confess, also that they were done merely to satisfy my own insatiable curiosity. Still I consider the circumstances worth recording, especially where they may meet the notice of those who, like myself, take an interest in these things; for we not unfrequently see that what are at times considered to be nothing but worthless and insignificant incidents, often turn out in course of time productive of very important and valuable results. Something of this kind may accrue from my observations, as they may, I hope, be the means of stimulating others to investigate the matter more fully and with greater diligence.

It is also worthy of notice that, of the two species of *Hyperia* which I have found in the *Medusa*, *H. galba* has always been the more numerous, and that by far the greatest number have been young and immature specimens. I have counted as many as thirty in one *Medusa*, and only a few of these were adults. In other instances, however, and that too of the most common occurrence, the numbers would vary from one up to about a dozen. But it must not be taken for granted from this that every *Medusa* has its *Hyperia*. This is by no means the case. I have seen multitudes without any.

As for *Lestrigonus Kinahani*, the forms so named are ever the fewest thus met with cooped up, and all have seemingly arrived at a state of maturity. I have never yet seen a young or small example of this species in a *Medusa*, but have taken them free. There appears to be little or no difference between the young and the old. They are both slender, and of a dark lead-colour, and both have the remarkable long and hair-like antennæ.

But besides these I have likewise taken *Anonyx Edwardsii*, *Dexamine spinosa*, *Atylus Swammerdamii*, *A. bispinosus*, *Eurydice pulchra*, and once a small specimen of *Portunus marmoreus* from *Medusæ*; yet who would ever think of calling these creatures parasitical? Carcinologists do not, neither will we—although some of them may have occasionally been seen taking a quiet ride on the back of some of the smaller *Medusæ*.

It will be seen from the foregoing that only two species, viz. *L. Kinahani* and *H. galba* (m. & f.), have been in a measure particularly alluded to. The others will form the subject of and be more fully treated in another Note.

On the Surface-fauna of mid-Ocean. By Major SAMUEL R. I. OWEN, F.L.S., F.A.S.L., F.M.S.L., Associate of King's College, London.

[Read June 7, 1866.]

[PLATE V.]

No. 2.—FORAMINIFERA.

IN a paper read before the Society and published in vol. viii. of the 'Journal,' (page 202) I mentioned that I had found some genera of the Foraminifera living on the surface of the ocean. I wish in my present communication to give the names of the species and the localities in which I have met with these Rhizopods, together with such other observations on them as may appear worth recording. Like their kindred the Polycystina, they appear on the surface after sunset. All that I have hitherto met with have been, as might be expected, of the unattached forms, and they are all included in the two genera *Globigerina* and *Pulvinulina.*

To *Orbulina*, which likewise is constantly met with on the surface, I shall refer presently.

All the varieties of form of *Globigerina*, in Mr. Parker's opinion, may be included in two or three subspecies; *G. bulloides*, *G. inflata*, and *G. hirsuta*.

Of the genus *Pulvinulina*, *P. Menardii* is the principal representative. *P. Micheliniana* is met with somewhat more rarely. *P. canariensis*, which the same authority considers to be but a starved-out form of *P. Micheliniana*, is also found. *P. crassa*, an Old Chalk form, I have met with in the South Atlantic. These two genera both belong to the second family, Globigerinidæ, of Dr. Carpenter's suborder Perforata.

I have never met with any trace, not so much as a single individual, of the Imperforata, or of the families Lagenidæ and Nummulinidæ of the Perforata. Thus we find one genus of the subfamily Rotalinæ, and one genus of the subfamily of the Globigerinæ, alone making the surface of the ocean their home.

I have never met with any form of the subfamily Textularinæ.

With regard to *Orbulina*, Dr. Carpenter in his work 'An Introduction to the Foraminifera,' at p. 177, states that it has been considered to be but a development of *Globigerina*, and that the young of that genus have been found within it ; in fact it is but a form of *Globigerina*. I think he is quite correct, with the exception that it does not contain the young of that genus: a few small chambers attached to each other, precisely as in the commonest form of *G. bulloides*, which are generally of a size inconsiderable compared with the outer sphere, are all that are found inside it; they are firmly attached to its inner surface, and I consider them to be its own proper chambers.

Orbulina may have no internal chambers; sometimes it has two or three, at other times many may be found within.

I have not met with any *Orbulinæ* that have a large aperture externally; but their whole surface is perforated with smaller and larger openings for the passage of the sarcode. Dr. Wallich in his 'North Atlantic sea-bed,' mentions his having found an Annelid at the bottom of the deep sea, to which he gives the credit of boring the shells of the *Globigerinæ*. I fancy it quite likely that the holes found in the *Orbulina* may be due to the same cause.

The outer sphere may be regarded as a wild-growing closing-in chamber; this form of growth is at times imitated by *Pulvinulina*, the outer chambers of which species then take on the same texture as is common to the outer chambers of *Globigerina* (*Orbulina*) *universa*. I am indebted to Mr. Parker for showing me precisely analogous cases in the growth of *Cymbalopora* and *Discorbina*; but in each of these genera it appears to be much rarer than in *Globigerina*.

I propose to make *Orbulina* a subgenus of *Globigerina*. The internal chambers are in form remarkably like those of *Globigerina*, and like them, also, they present themselves with varying surfaces, some free from, while others are covered with, spines. The form without internal chambers has been known under the name of *Orbulina universa*; I propose now to call it *Globigerina* (*Orbulina*) *universa*. The two forms containing the internal chambers may be regarded as subspecies, and appropriately designated *Globigerina* (*Orbulina*) *continens*, n. sp., and *Globigerina* (*Orbulina*) *acerosa*, n. sp., respectively,—the former being without, and the latter having, spines on some of its internal chambers. These spines, as well as those of *G. hirsuta*, are composed principally of carbonate of lime. I have found that they dissolve in weak acid; and under Mr. Parker's treatment with boiling potassa they were unaffected, which proves them to be not siliceous.

These spines on *G. hirsuta* have been looked upon as ossifications of the pseudopodia; but I find on examination that they do not take their rise from the centre of the honeycombed depressions of the surface in which the apertures are situated to admit of the extrusion of the sarcode, but are continuations of the material of the raised portions of the shell which surround the hollows. From their delicate nature, most of them get broken off in the nets; when unbroken, their ends are pointed, not very finely, but somewhat resembling the ends of *Belemnites mucronatus*. The texture and formation of these outer chambers in *Globigerina* (*Orbulina*) *universa* vary considerably—from a thin, fragile ball, to one in every respect equalling in thickness the chambers of *G. bulloides*.

The habits of *Globigerina* and *Pulvinulina*, I have proved to be identical, inasmuch as both frequent the surface of the ocean, to the possible exclusion of all other forms of the Foraminifera, and have the power of rising to and descending from the surface.

The one I find placed by Dr. Carpenter at the highest, and the other at the lowest, end of their respective subfamilies. I think it desirable that they should be brought together and made into a separate and what appears to me to be a natural family, for which I propose the name of Colymbitæ*.

This family, then, will include two genera that, perhaps, ought never to have been separated, as their affinities are strongly marked, and their habits, and probably their structure, differ from those in the other forms of the Foraminifera.

Their having the power of rising to the surface surely shows that the animal must have some special means or organs adapted to this purpose; although they may not be distinguishable at present to our observation, the fact, I think, may be taken for granted. This family of the Foraminifera may then be considered to be the most nearly allied to the Polycystina, which, as I have before proved, are frequenters of the surface of mid-ocean.

Observation may yet show us the means used by both to enable them to rise and sink at pleasure. I may here mention that the *Acanthometræ* appear to have the same power and habits; and we may therefore infer that all these Rhizopods have some portion of their organization in common: I am not yet prepared to say whether or not all the recent known Polycystina may be found on the surface.

Dr. Wallich, in his work on the 'North Atlantic sea-bed,' does not appear to be able to prove quite satisfactorily that the *Globigerinæ* which he succeeded in getting from the bed of deep portions of the ocean were absolutely alive at the time taken; for he has the following passage at page 136:—"Under the most favourable circumstances and only after the lapse of considerable time do the shallow-water forms, when in captivity, exhibit pseudocyclosis or extend their pseudopodia; and hence, since it is in the last degree unlikely that those brought up from extreme depths should present these evidences of vitality, we must rest content with collateral proofs: fortunately these are of a very satisfactory kind." From this it will appear that the rising of these shells from the bottom after they have once fallen to it, is not yet satisfactorily proved.

That Dr. Wallich does not consider the *Globigerinæ* to be distributed through the waters of mid-ocean the following quotation from his work will show; and from it will be seen likewise that their shells are found as universally distributed at the bottom as I have proved them to be on the surface. "The minute calcareous shells of the Foraminifera are the most frequent and widely distributed organizations of the ocean. They occur in all seas, in more or less abundance. But there is one genus (namely *Globigerina*) which may be regarded as essentially oceanic, since it is to be found in all latitudes, and at all depths, ranging from 50 to 3000 fathoms. Its seat of maximum development is on the deepest areas of the sea-bed. There, like the sands of the shore, it strews hundreds of square miles of surface, and apparently builds up vast strata. The great superficial current of the Atlantic does not bear it away in countless multitudes from tropical coast-lines, nor does the body of the ocean itself constitute its habitation."

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* From *κολυμβητὴς*, a diver.

To this there is the following note affixed at page 137:—"By sinking very fine gauze nets to considerable depths, I have repeatedly satisfied myself that *Globigerina* does not occur in the superficial strata of the ocean. On one occasion a small bag was drawn up through 700 fathoms of water in a locality where *Globigerina* abounded on the sea-bed, without entrapping a single shell."

To those whose minds are so constituted as to admit the conception of unlimited time for submarine deposits, the insignificance in size and quantity of this the Colymbitic family of the Foraminifera will be no obstacle to believing that the surface is their home; others, who wish for a larger and quicker supply to account for such deposits, must still look, with Dr. Wallich, for the abundance necessary to suit their views, to what may prove to be but their sepulchre.

I do not think with Dr. Wallich that it is absolutely necessary for these forms to sink to or to reside at any great depth for the purpose of recruiting their store of carbonate of lime, which is there supposed to be held in solution in greater quantities than at the surface, where, in mid-ocean, it is either altogether absent or very nearly so; while, on the same authority of Bischoff as quoted by Dr. Wallich at page 122, there are more than 3½ of chloride of calcium in every 100 parts of soluble material contained in the salt water of the ocean, which in itself contains 3½ per cent. of such soluble matter; and the supply of carbonic acid can be drawn from the atmosphere, either directly, or after its having been dissolved by the surface-water which they frequent. Such a little bit of chemistry, I take it, can be easily performed by organized beings.

At page 155 of the same work we find the following:—"The conditions prevailing at great depths render it impossible for organisms still constituted to live under them to rise to the surface, or for the remains of these organisms after death to make their appearance in shallow water." If this important proposition at which Dr. Wallich arrived has been really established, then the rising of the *Globigerinæ* to the surface after having once subsided to the bottom, or to any considerable depth, is an impossibility. But on the other hand he says, in the same paragraph, "The conditions prevailing on the surface of the ocean render it possible for organisms to subside after death to the greatest depths, provided every portion of their structure is freely pervious to fluid." Now, as the Foraminifera are found living on the surface, if such laws prevail, they could never have been generated at, nor risen from, the bottom, but they might have been generated at or near the surface, and those found below might have subsided before or after death: we can hardly suppose that the two localities could produce precisely the same living organisms, if all communication from below upwards, in consequence of the existence of such a law, had been cut off between them. I therefore think it most probable that the Foraminifera found at the bottom were dead, or that they must have some means of again rising to the surface. To those who consider this impossible it must be left to get over the difficult ground interposed in the form of two or three miles of water, if they still consider that the bottom of the ocean is their natural habitat and the place at which they are bred.

I will now proceed to give the results furnished by my nets in the different localities over which I have worked.

The remarks made on each spot (for which the latitude and longitude are given) may be generally considered applicable to the whole space between it and the preceding one; for each portion was carefully gone over, day and night, in calm and storm, nets suited to the weather and rate of sailing having been used.

My observations in the Bay of Bengal must be taken as very incomplete. I was not on any occasion devoting my researches especially to the Foraminifera, but to other forms of life; and the state of my health on the last occasion when leaving India interfered with my work during the first part of the voyage.

The rest may be depended upon, with the exception of a few degrees near the Cape of Good Hope. After leaving lat. 37° S., and long. 26° E., I had no nets out for some three or four days.

At the head of the Bay of Bengal during the months of November and December, February and March, I found a few specimens of *Globigerina bulloides* of both forms, No. 1 and No. 2 as here represented (Plate V. figs. 6 & 7), also a very few of *Pulvinulina Menardii.* Running down the bay in long. 90° as far as 15° south, these forms continued to be met with, but in no great abundance.

In lat. 17° S., long. 80° E., I met with a very few of *G. bulloides* No. 2, and *G. inflata.*

From this point to lat. 22° S., long. 72° E., although the surface of the ocean was not altogether free from Foraminifera, *G. bulloides* No. 2 was but rarely found.

In 26° S. lat., and 55° E. long., the Foraminifera for the first time became at all plentiful. *G. bulloides* No. 2 was here very fine in size, and the most common form; *G. inflata* was here very large, but few in number; *G. bulloides* No. 3 and *G.* (*Orbulina*) *universa* were likewise present, and the individuals large.

About 250 miles south of Madagascar, in lat. 29° S., long. 46° E., *G. bulloides* No. 1 and *G. inflata* were still fine and plentiful.

In lat. 26° S., long. 51° E., the centre of this track, where Foraminifera abounded, not a trace of them could be found during the daytime.

At about lat. 29° S., long. 43° E., Foraminifera were very scarce.

In lat. 31° S., long. 31° E., very near the south-east coast of Africa, there were a very few of *G. bulloides* No. 2, and I met with but one specimen of *G. bulloides* No. 1.

Running along the coast to lat. 32° S., long. 30° E., none were taken in the nets.

In lat. 33° S., long. 29° E., a very few of *G. bulloides* No. 2 made their appearance, with one specimen of *G. bulloides* No. 1.

In lat. 37° S., long. 26° E., the Foraminifera were a little more plentiful, but still very few, and the individuals small: there were some of *G. bulloides* No. 1 and *G. bulloides* No. 2, and *G. inflata* was not entirely absent.

After passing the Cape of Good Hope, and before reaching lat. 33° S., long. 12° E., I found a great change; the Foraminifera had become very abundant, very much more so, even, than they had been to the south-east of Madagascar. *G. bulloides* Nos. 1 and 2 and *G. inflata* were equally common; but *Pulvinulina Micheliniana* here made its appearance, a very few small specimens of *Pulvinulina Menardii* were also present, and *Pulvinulina canariensis* likewise showed itself.

From this point to lat. 30° S., long. 9° E., the Foraminifera became still more abundant, and continued so to lat. 21°, long. 0°.

G. bulloides Nos. 2 and 3, *G.* (*Orbulina*) *universa*, and *G. inflata* were in abundance, with one or two specimens of *P. Menardii*. *P. canariensis* was moderately plentiful, *P. crassa* was present, and I here observed some three or four individuals of *G.* (*Orbulina*) *universa*.

In lat. 28° S., long. 7° E., the number of Foraminifera found on the surface had arrived at its maximum. *G. inflata* was the principal form; *G. bulloides* Nos. 1 and 2, *P. canariensis*, and *P. Micheliniana* plentiful; a few of *G.* (*Orbulina*) *universa*, and one or two of *P. Menardii* were also found.

In lat. 27° S., long. 5° E., *G.* (*Orbulina*) *universa* became more common, and many of them were less round in their form. *G. bulloides* No. 2 and *G. inflata* plentiful, but *G. bulloides* No. 1 not quite so abundant as before; a trace of *P. Micheliniana* still met with.

In lat. 25° S., long. 3° E., the net was towing from four in the afternoon till daylight next morning, and showed that but very few Foraminifera were on the surface; there were more of *G. bulloides* No. 2 than other forms; *G. inflata* was entirely absent. *P. Menardii* was here represented more fully than hitherto, and by one very large specimen. Although the Foraminifera were scarce here, other forms of animal life usually met with at the same time of day were abundant.

In lat. 23° S., long. 2° E., the Foraminifera were equally abundant. *P. Menardii* were fine and plentiful; *G. bulloides* Nos. 1 and 2, *P. Micheliniana*, and *P. canariensis* were all present, together with several of *G.* (*Orbulina*) *universa*.

In lat. 22° S., long. 1° E., *P. Menardii* is found very large, and appears to be the principal form present, it seeming to have supplanted many of the others, with the exception of *G. bulloides* No. 2. *G. bulloides* No. 1 shows two or three specimens also; there was one of *G.* (*Orbulina*) *universa*; *G. inflata* not quite absent.

In lat. 21° S., long. 1° W., *P. Menardii* and *G. bulloides* No. 2 continue plentiful as before; *G.* (*Orbulina*) *universa*, *P. Micheliniana*, and *G. inflata* but show their presence: at this point the abundance of the Foraminifera appeared to end. It was during the end of April that I sailed over this portion of the ocean.

In lat. 18° S., long. 2° W., very few Foraminifera were met with—some dozen individuals of *G. bulloides* No. 2, three of *P. Menardii*, and one of *G.* (*Orbulina*) *universa*.

In lat. 15° S., long. 5° W., the same scarcity remained: one specimen of *G. bulloides* No. 1 was found, with a few of *G. bulloides* No. 2 and *G.* (*Orbulina*) *universa.*

In lat. 15° S., long. 6° W., the same scarcity; this continued at lat. 13° S., long. 8° W.

In lat. 12° S., long. 10° W., the number of Foraminifera very slightly increased to a few of *G. bulloides* No. 2, two *Orbulinæ*, and one *P. Menardii.*

In lat. 11° S., long. 10° W., a very slight increase took place.

In lat. 3° S., long. 18° W., the Foraminifera again became abundant—*G. bulloides* No. 2 and *P. Menardii* being equally fine and plentiful, with a trace of *G.* (*Orbulina*) *universa* and *G. inflata*: this was in the night of the 12th of May.

In lat. 2° S., long. 19° W., the Foraminifera had again nearly disappeared; still there were a few of *G. bulloides* No. 2, but more of *P. Menardii.*

In lat. 1° S., long. 21° W., but a trace remained of the same forms.

In lat. 0°, long. 22° W., *G. bulloides* No. 2 became more plentiful, with traces of *G. inflata*, *G. bulloides* No. 1, and *P. Menardii.*

In lat. 2° N., long. 23° W., there were about the same number of the Foraminifera as before, consisting of *G. bulloides* No. 2 and *P. Menardii*, but the latter was here the more abundant of the two forms.

In lat. 3° N., long. 24° W., the same observations may be applied to this part.

In lat. 6° N., long. 26° W., no Foraminifera on the surface.

In lat. 7° N., long. 26° W., a very few of *G. bulloides* No. 2, with traces of *G. bulloides* No. 1, and *G. inflata.*

A few miles to the north-west of the last spot, *G. bulloides* No. 2 and *G. inflata* suddenly became more plentiful, and amongst them I noticed two specimens of *P. Menardii* and one of *G.* (*Orbulina*) *universa.*

In lat. 9° N., long. 28° W., the Foraminifera were met with in great abundance: they consisted of *G. bulloides* No. 2 and *G. inflata*, together with a fair supply of *G.* (*Orbulina*) *universa* and a trace of *P. Menardii.*

In lat. 10° N., long. 29° W., the Foraminifera were in as great profusion as I have ever met with them. *G. bulloides* No. 1 and *G. inflata* were the principal forms; but P. *Menardii* and *G.* (*Orbulina*) *universa* were well represented, and of *G. bulloides* No. 1 there were many individuals.

In lat. 12° N., long 30° W., I believe the same profusion continued; but my nets were broken.

In lat. 14° N., long. 33° W., Foraminifera still continued in great abundance. *G. inflata* was the prevailing form; there were a few of *G. bulloides* No. 2 and *G.* (*Orbulina*) *universa*; I observed also traces of *G. bulloides* No. 1, *P. Micheliniana*, and *P. Menardii*.

In lat. 19° N., long. 36° W., the Foraminifera became rare. Of *Globigerina*, *G. bulloides* No. 2 and *G. inflata* were the only forms; but I observed one individual of *P. Micheliniana*.

In lat. 20° N., long. 38° W., no traces of Foraminifera.

In lat. 30° N., long. 43° W., scarcely a trace of Foraminifera. I met with but seven individuals of *G. bulloides* No. 2. From the last spot to this, we had passed some Gulf-weed, but it was in very small quantities.

In lat. 33° N., long. 44° W., slight traces of *G. bulloides* No. 1.

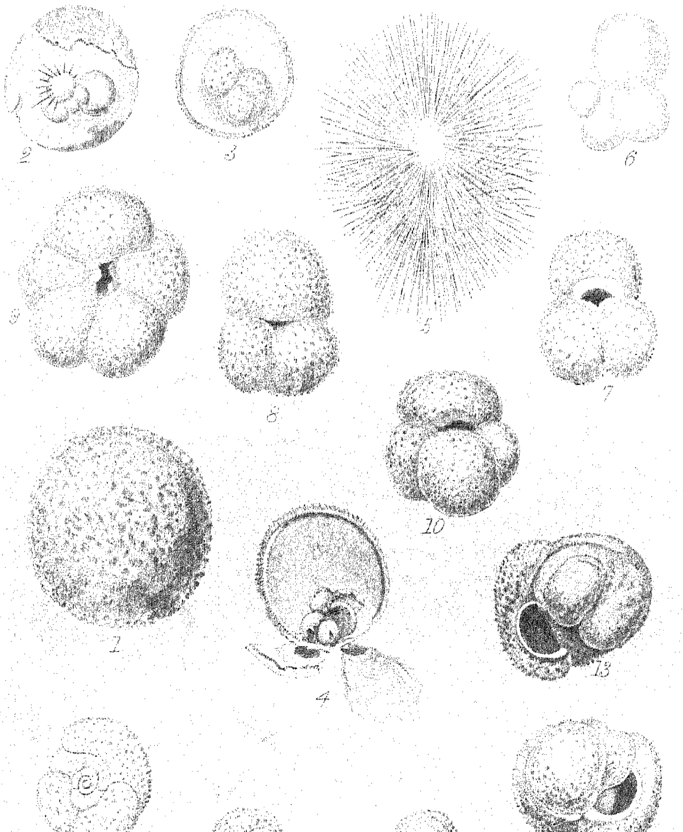
On Dr. Wallich's authority, I should consider that the Foraminifera are, at times and under certain conditions, plentiful on the surface of the ocean in more northern latitudes in the North Atlantic; for he has found them abundant at the sea-bottom: (I quote from page 137) "between the Faroe islands and Iceland, between Iceland and East Greenland, and for a considerable portion of the direct route between Cape Farewell and Rockall, *Globigerina* is the prevailing form in the deposits."

It will be observed that there were places in the Indian Ocean, and also in the North and South Atlantic, where I found the Foraminifera in great abundance—occasionally for one night only, but generally for many nights in succession, although during the daytime they were absent from the surface; they did not, then, after rising once and sinking, entirely disappear from the spot, but they would on the contrary reappear nightly over many hundreds of miles of water.

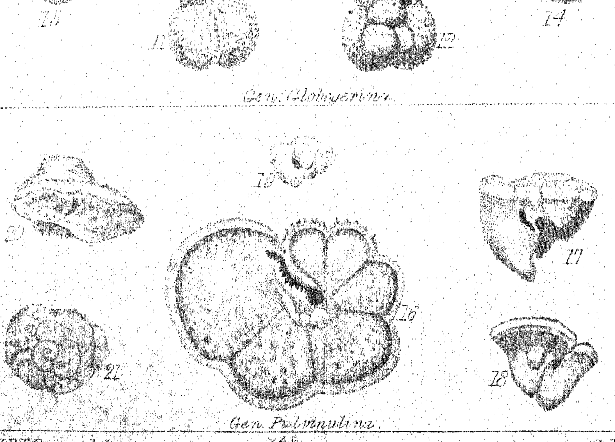
Their presence on the surface did not depend entirely on the weather; for in calm nights they have been found absent, or nearly so, while in fresh blowing weather the produce of the net showed that they were plentiful.

Further observations, if recorded as the above, will show us whether the presence of the Colymbitæ is confined to certain localities, or if they are to be met with in equal abundance at different times in all parts of the ocean.

In the above list of species met with, *G.* (*Orbulina*) *universa* must be understood to include both the other subspecies, viz.



Gen. Globigerina.



Gen. Pulvinulina.

Major S.R.I. Owen. del. ×45 G. Jarman. sc.

acerosa and *continens*, as, without breaking the outer chamber of every shell, the difference could not often be determined.

Note.—From the latitudes and longitudes given above, the ship's course can be readily laid down on a map; and a more graphic representation will thus be obtained of the distribution of the minute ocean-fauna than can be conveyed in words.

DESCRIPTION OF PLATE V.

Fig. 1. *Globigerina* (*Orbulina*) *universa.*
2. *G.* (*Orbulina*) *acerosa*, n. sp.
3. *G.* (*Orbulina*) *continens*, n. sp.
4. *G.* (*Orbulina*) *continens* broken through the internal chambers.
5. *G. hirsuta.*
6. *G. bulloides.* Form No. 1.
7. *G. bulloides.* Form No. 2.
8. *G. bulloides.* Form No. 2: reverse side of Fig. 7.
9. *G. bulloides.* Form No. 3.
10, 11. *G. bulloides.* Other varieties.
12. *G. bulloides.* Reverse side of Fig. 11.
13. *G. inflata.* A sinistral shell.
14. *G. inflata.* A dextral shell.
15. *G. inflata.* Upper surface of a sinistral shell.
16. *Pulvinulina Menardii.*
17. *P. Micheliniana.*
18. *P. crassa.* A dextral shell.
19. *P. crassa.* A sinistral shell.
20, 21. *P. canariensis.*

On the Otolites of Fish, and their value as a test in verifying recent and fossil Species.

By E. T. Higgins, Esq., M.R.C.S. &c. (Communicated by G. Busk, Esq., Sec.L.S.)

[Read May 3, 1866.]

The object of this paper is an attempt to show that the otolites of fish have a certain distinctive value in determining the genera and species to which they belong, and that the close study of them in the recent forms will enable the ichthyologist to confirm or disprove the specific relationship of recent individuals, and the geologist to determine the affinity of the fossil species. In making this attempt, it will be necessary to state my belief to what extent fish possess the faculty of hearing, and, in doing so, to indicate the various modifications of the auditory apparatus of other members of the animal kingdom for comparison. The auditory organs consist of a contained fluid and of a solid body or bodies, with which the fibrillæ of the acoustic nerve are in close communication; but in order to render this simple form available for the recognition of delicate modulations, and give judgment of the distance and position of the vibration, a more complicated apparatus is given to the higher orders of the Vertebrata. We find in the Reptilia a drum or tympanum to receive the vibrations and transmit them, by means of an ossicle called the columnella, to the internal ear; a canal bent upon itself also makes its appearance, which may be looked upon as a rudimentary cochlea. A similar, though slightly modified, arrangement exists in birds. In Mammalia, in whom the powers of hearing are more acute, and whose power of appreciating modulations is more sensitive, we have an acoustic instrument of the most perfect description, consisting of a chain of four ossicles, a well-developed cochlea, tympanum, and external ear. By many naturalists the circular arrangement of feathers surrounding the external opening of the ear in some birds has been looked on as the equivalent of the external ear in Mammalia; it must, however, be but an imperfect representative.

As, however, sonorous vibrations communicated to water pass through it with great intensity, it is absolutely necessary that a considerable modification of the auditory organs of its inhabitants should exist, or they would be perpetually liable to injury, or even death, from the violence of vibratory shock; we therefore find, as might be anticipated, a much simpler form of auditory apparatus in fish, deprived of external ear, tympanum, and cochlea, though it has been stated that a rudimentary cochlea does exist in some fish. This rudimentary form will at once suggest that fish derive their sense of hearing from other sensations than such as we term *sound*, and receive over the whole surface of the body vibrations which are conveyed to the internal ear. That a fish does not possess hearing in any other than a very simple degree is capable of proof; and we have frequent and direct evidence that they have no sense of either the direction or the immediate vicinity or distance of the source of the vibrations which disturb them. The experience of fishermen confirms this. A shoal of fish taking the bait freely will be disturbed, and sink at once to the bottom of the water, on the rounding of a point by a steamer, though at an immense distance, with as much alarm as if the danger threatening them were in the immediate neighbourhood. Without for an instant doubting that fish possess, in an exquisite degree, the sense of hearing, *i. e.* of receiving the vibrations conveyed through the water, I must differ in opinion from Pliny and all subsequent writers who speak of fish "coming when they are called," of their being "assembled by means of music or of a whistle," for one reason: "Sonorous vibrations taking place in the air are with difficulty communicated to the water, unless a membrane be interposed." And yet, in the above-cited cases no artificial tympanum having been interposed, we are called upon to believe that fish perceive and recognize the various modulations of sound taking place in the air. May we not rather explain their assembling at any one spot by the vibrations communicated through the earth to the water giving them notice of the approach of some person to the spot where they are accustomed to be fed? It is a fact well known to all observant anglers, that, provided they keep out of sight and remain still, all the talking, whistling, and shouting will not disturb the fish one hundredth part as much as one stamp of the foot or sight of the person.

There exists considerable modification in the form of the auditory apparatus in the various families of fish; and the passage from the "single tubiform labyrinth of the Myxine," through the "*two* semicircular canals and vestibule of the Lamprey," into the *three* semicircular canals and vestibule of the higher cartilaginous and the whole of the osseous fishes is very simple.

The vestibule has been described as "dilating into one or more sacculi, separated from the *alveus communis* by a constriction or narrow canal." This description may apply to a few fish; but in by far the larger number no such separation exists. I shall therefore speak of the whole as the vestibule or vestibular sac, connected by one, two, three, or more tubular prolongations with the semicircular canals, the whole being filled with a thick mucilaginous or oleaginous fluid called endolymph, and surrounded by a thinner fluid, perilymph. "The semicircular canals are anterior, posterior, and external," and, though of large size, are considerably smaller than the passages traversed by them, and are suspended in them by a delicate network of fine threads of cellular membrane, no doubt for the purpose of softening the shocks received through the walls of the skull.

"In the higher Plagiostomata (Sharks and Rays) and in the Sturgeon, and also in the Lepidosiren, the whole are imbedded in the walls of the cranium," whilst in the osseous fish these internal parts of the auditory apparatus are lodged in a depression of the posited by a dialytic process, a thin section showing layer upon layer in strict accordance with such an origin."

Such is unquestionably the case with some of the Gadidæ, and may perchance be the character of the family; but in by far the largest number of fish the structure more nearly resembles that of bone.

The otolites amongst osseous fish may be said to be three in number on each side, as the exceptions to the rule are very rare. During the examination of more than 3700 fishes, I have only noticed five instances to the contrary. In three they were altogether wanting on one side, and normal on the other; these were in a Perch, Roach, and Salmon, fish possessing otolites sufficiently large to be readily found, if they existed. The fourth instance occurred in a Carp Bream (*Abramis brama*): the otolites on one side were quite normal in size, shape, and number; but on the other side *it* (for there was only one) was cartilaginous and abnormal. The fifth occurred in *Synaphobranchus Kaupii*, the anterior and posterior otolites being represented by numerous minute crystals imbedded in a tough membrane.

Though amongst my series of otolites a few examples of the three are exhibited, yet the only one of scientific interest is the central or largest, as the other two, which are usually placed superiorly and posteriorly, though occasionally lying on the central, or with it (as in the Cyprinidæ) forming a chain of bones, are in the majority of fish so small as to be with difficulty found, and, when found, of so little use for the purpose of scientific identification that I will almost pass over them, merely stating that the superior is usually more globose, smaller, and rather porcellanous, and varies considerably in form, being rounded, triangular, stellate, or hastate. The posterior otolite is usually semitransparent, somewhat resembling fish-bone in appearance, rounded, quadrate, semilunar, in one instance resembling the *stapes* wanting its base, and generally pectinated. Although many thousands of fossil otolites have been examined by me, no specimen that could be referred to either of the above has yet been met with.

The central or largest otolite is crystalline in structure, porcellanous, closely resembling beautifully pure enamel in appearance, very brittle, owing to the imperfect cohesion of its atoms, easily rubbing down into almost impalpable powder. In spirit the porcellanous appearance is after a time destroyed, and the otolites become, to a certain extent, chalky and opake. This otolite is concave above, convex and grooved below, indented or denticulated at the margins, as a general rule wider anteriorly than posteriorly, though sometimes just the reverse—usually longer than broad, ovate, quadrate, pyriform, tapering at both ends, furcate at both ends, or furcate at one end and rounded at the other. In fact, to give anything like an idea of their protean forms, a description of almost every species would be necessary.

In the Sturionidæ, or Sturgeons, which are always arranged between the cartilaginous and osseous fish, the otolites, as might be expected, are of an intermediate type and distinct form, consisting of slightly adherent crystalline granules, imbedded in a dense cartilaginous membrane.

In the true cartilaginous fish the otolites are soft, shapeless masses, closely resembling wet chalk. Under a microscope they are seen to be composed of almost perfect rhombic crystals.

A good deal of stress has been laid on the shape of the "groove on the under surface of the central otolite, as absolutely necessary for the identification of a species." I am quite ready to admit that there is a very great difference in its shape amongst genera; but in closely allied species it is so similar as to be almost identical, and therefore, *per se*, not to be depended upon. So far as my experience goes, identity of outline is the only certain character: and fortunate it is that such is the case; for in by far the largest number of fossil otolites the convex under surface is more or less bouldered and consequently the shape of the groove altered, so that, were this essential for identification, but few species could be recognized. The concavity of the upper surface being better preserved, the task is rendered comparatively easy, and but little skill is necessary in dividing them into species. Without attempting to give a rigorous definition of what ought to constitute a species, I may remark in general terms that wherever I find fishes differing from each other to that degree and in those external characters which are usually accepted by naturalists as entitling them to rank as a distinct species, there I find each of these species having a distinct otolite, and with the distinction sufficiently well marked to enable me to refer each otolite, when detached, to the species of fish from which it has been taken—after having, of course, once seen it *in situ*. Now this is, perhaps, more than can be said of either teeth or scales, and certainly than can be stated of any other isolated portion of the skeleton or hard parts in fishes; and it is a generalization of the highest interest in connexion with palæontological researches, as these otolites are often met with in tertiary formations when no other vestige of the fish to which they belonged has been preserved, all the other remains consisting of teeth and vertebræ of cartilaginous fish. It may be as well to state that, so far as my examinations of British fish have gone, every species, recognized as such by Mr. Couch, has its distinction borne out by the otolites.

Much diversity of opinion exists as to whether the otolites are to be looked upon as the "analogues" or "homologues" of the *ossicula auditûs*; but it appears to me that their position in the vestibular sac and semicircular canals proves that they are only excessive development of the otocones, and not representatives of the true ear-bones,—an opinion in which I believe most anatomists will concur.

In a short notice published some years since, I stated that the specific characters of the otolites were more to be depended upon than the generic. Further investigations induce me to considerably modify this assertion; and although every species may be recognized by its own peculiar central otolite, I am inclined to believe that it is possible to group the species of each genus as having some character in common.

Fossil otolites have long been known to all collectors of tertiary fossils, but no classification of them has yet been made. The first attempt was that of Mr. Charlesworth, nearly thirty years since, and engravings were made of some of the principal forms; but I believe nothing further has been done with them. The formations which have yielded them in the greatest abundance are the Crag (Coralline Crag), the Hordwell Highcliff, Bracklesham, Brook, and Bramshaw tertiary-beds, and the Gault of Folkestone.

All the otolites from the Coralline Crag, that I have yet had an opportunity of examining, belong, without a single exception, to existing species of Gadoids, viz. Cod, Whiting, Pollack, Whiting Pout, Green Cod, &c.; there is therefore every reason for believing that the portion of a skeleton of a fish from the Coralline Crag, described in the 'Geologist,' and with some hesitation referred to this family, was undoubtedly Gadoid.

Sufficient has been said, I think, to prove that, to the Palæontologist, the careful examination of these small bodies will be of great assistance in enabling him to trace to a comparatively remote era the first appearance of many of the existing species of fish.

To the student of recent ichthyology they will be found of equal value, enabling him to discriminate between closely allied forms. I speak with tolerable confidence of their specific value, having examined more than 3700 fish, representing nearly 450 species, and never yet, save in the instance of the Carp Bream, found any abnormal form which could create a difficulty in identifying a species if ever seen before. In some closely allied species I must admit that the distinctive marks are very slight, but sufficiently characteristic to make their separation and identification a matter of no great difficulty.

1. In the Percidæ. The central otolite is more or less oblong (as in *Perca*, *Labrax*, and *Polyprion*); oval, posteriorly acuminate (as in *Acerina*, *Trachinus*, &c.).

2. In the Gurnards. Almost circular, with a slight furcation, margins indented.

In *Cotti*. Long and narrow, tapering at each end.

In *Gasterostei*. Smooth and rounded.

3. In the Sparidæ. Very concavo-convex, margins, especially the inner, deeply indented, tapering considerably at either end.

4. In the Scombridæ. Furcate (as in *Scomber* and *Caranx*); stellate (as in *Zeus*); irregularly pisiform (as in *Capros*).

5. In the Tænidæ. Elongated (as in *Sepola*); very deeply concave, the inner and outer margins bent inwards (as in *Trichiurus*).

6. In the Mugilidæ. Very concave, margins indented; width nearly equal.

7. In the Gobioidæ. Furcate (as in the Blennies and *Anarrhichas*); globular (as in the Gobies); elongated (as in *Callionymus*).

8. In the Lophiidæ. Outer margin semilunar, inner denticulated.

9. In the Cyprinidæ. Subglobular, cuneate posteriorly, the degree of cuneation being specific.

10. In the Esocidæ. Furcate, inner margin denticulated (as in *Esox*); elongate and oval (as in *Belone*, *Hemiramphus*, &c.).

11. In the Siluridæ. Subglobular and mammillated (as in *Callichthys*); pisiform (as in *Silurus*).

12. In the Salmonidæ. Rather triangular, anteriorly acuminate (as in *Salmo*); posteriorly furcate, denticulated below, and slightly acuminate anteriorly (as in *Coregonus*).

13. In the Clupeidæ. Posteriorly furcate and truncate, anteriorly rounded and indented.

14. In the Gadidæ. Thick, mammillated; pyriform, or elongate oviform (as in *Morrhua*); elongated and tapering (as in *Motella*).

15. In the Pleuronectidæ. Nearly flat, oval, rounded, quadrate or truncate.

16. In the Echeneidæ. Oval and furcate, deeply grooved.

17. In the Muræenidæ. Oval (as in *Conger* and *Anguilla*); globular (as in *Leptocephalus*).

18. In the Anguillidæ. Elongate (as in *Ammodytes*).

19. In the Syngnathidæ. Globular.

20. In the Gymnodontidæ. Globular and very irregular (as in *Tetrodon*).

21. In the Sclerodermi. Irregular, posteriorly acuminate (as in *Balistes*).

Stray Notes on some of the smaller Crustaceans. Note II. On the Habits, &c. of the *Hyperiidæ*. By THOMAS EDWARD, A.L.S.

[Read December 6, 1866.]

As intimated in my last, I would now speak more fully of the other three species alluded to, viz. *H. oblivia*, *medusarum*, and *minuta*.

Although I have, as already stated, occasionally taken both the others from the *Medusa*, I have never as yet met with, nor seen, even so much as a single specimen of either of these attached to anything. And of the first (*H. oblivia*) which seems to me to be the most abundant of the whole tribe, at least in this quarter, I have seen thousands, nay, millions, or countless hordes. So numerous are they occasionally, that I have seen the water to a certain extent darkened by them; and this was the case when not a single *Rhizostoma* was within view, or perhaps on the coast. And instead of the *Hyperia* assailing the fish, the latter would seem to have become the aggressors; for the stomachs of many of those that were caught about the periods referred to were generally well stored with these Crustaceans.

On one occasion, and in winter, immense shoals of the common Herring (*Clupea harengus*) chanced to visit us—a rather rare case; and great numbers were taken. About two dozen of these came into my household, and, as is my usual practice with all kinds of fresh fish, I of course looked into their stomachs to see what could be got there. On doing this I was rather surprised to find them all full of this Amphipod, as I had never before found them in the herring. This caused more to be procured, which were caught the day after, and I found their stomachs full also. From one I took 59, from another 47, and from a third 33; and all the others were more or less well crammed.

These statements are not on hearsay. They refer to undeniable facts which came under my own personal observation.

Now, if all the herrings composing these shoals had been as well supplied as those I dissected (and we cannot tell that they were not), how amazing must have been the number of this Crustacean! It is likewise worthy of remark that these herrings were taken at from four to five miles from land, or perhaps more.

Again, I have also seen them cast on shore during gales from the north (Banff lies on the south side of the Moray Firth) in most enormous and incalculable numbers. On one occasion, and for some distance, our rock-pools were filled with literally one living mass of them. But if I was astonished at this, what was my surprise, on reaching the sands which run continuous with the rocks alluded to, at beholding a ridge or wall of these animals extending more than a hundred feet in length, and varying from 1 to 2 inches in height and breadth, which had been washed up by the sea! And, instead of lessening, each succeeding wave only added thousands upon thousands to the general wreck. On another occasion a still larger portion of the sands were again strewn in a similar manner; but there were none then in the rock-pools. They would appear to come inshore in great bodies at times, in search of food perhaps; and should a storm arise, they are then of course unable to work their way out, and are in consequence inevitably overwhelmed in ruin by being tossed on land.

From these facts, something like at least a vague idea may be formed as to the prodigious numbers of this species. But it is only those who have been blessed with a sight of the vast legions which occasionally appear who can form anything like a true estimate of the fact.

I cannot, however, say so much for, nor of, the other two species. Whatever they may be elsewhere, they are the scarcest of the genus here. I have only taken *H. medusarum* on three or four occasions, and but a few each time.

This species is decidedly the gem of the whole. It is partially pellucid, being beautifully banded, alternately, with rings of a crystal hue and others of a deep red.

As regards *H. minuta*, I have only taken it twice, and even in fewer numbers than the last.

Having kept these alive also, I am enabled in some measure to say that in their general manners all three resemble each other, their restlessness and activity being one of their most remarkable traits, and beyond the power of description. But if I were to particularize any of them as being more lively and more restless than the rest, I certainly should give *H. minuta* the character, as being the most active species which, so far as I remember, I have as yet seen. All three seem to me far more active in their whole movements than either of their congeners, *L. Kinahani* or *H. galba*, and they do much better in confinement.

It strikes me very forcibly that these are what some would call carnivorous in their diet; at least I am pretty sure that *H. oblivia* is, and am inclined to think that the others are so likewise, from the fact that their habits are so alike in every other respect.

On one occasion I put a few individuals of *Hyperia oblivia* beside some shrimps (*Crangon*, *Mysis*, &c.). On looking again some time after, I saw one of the *Hyperiæ* on the back of a *Mysis*. I also observed the latter give some strange jerks with its tail, but took no further notice of the circumstance, not dreading anything serious. The shrimp was swimming at the time with the burden on its shoulder. This was in the evening. Next morning I found both at the bottom, still together, but the shrimp dead. This drew my attention more closely to the case, and I endeavoured to drive the *Hyperia* away; but, although I twirled him with a camels'-hair brush for several minutes, I failed in my object; and it was not until I had the *Mysis* at the top of the water that he condescended to let go. I then examined the shrimp, and found an incision at the extreme end of the carapace, and just where the soft part of the body commences, and so deep that the animal broke in two on being again lifted. I am not saying from this, however—at least I do not affirm it as a truth, that the *Hyperia* killed the shrimp; but I believe he did, and, by way of making food, had scooped out the part alluded to. I have lost shrimps in this way before, without very well knowing why. I likewise find various of the softer species when cast on shore treated in the same fashion when the *Hyperiæ*, and especially *H. oblivia*, are on the coast. They appear well enough until you attempt to take them up, when they in most cases break either into two or three pieces. Fragments, too, are often thrown up. I know that *Eurydice pulchra*, the little tyrant of the shore, is a great enemy to the shrimp, and many others of his kind, but I am much mistaken if some of the *Hyperiæ* are not something similar.

It would seem that not a few of our Crustaceans, like several species of birds and fish, &c., are to some extent migratory; and perhaps to no portion does the term apply so much as to those now under consideration. Although they may not exactly observe the same regularity and order as some other of our migrants do, still I am certain that they do make periodical, or in some cases it may be but casual visits, at least to this part of the kingdom. I have never yet missed *H. oblivia* a single season since I began to look to these things, and was able to go out. The same may almost be said of *L. Kinahani* and *H. galba.* But although I have not met with these so invariably, nor even with *H. medusarum* and *minuta*, still that is no proof that they are not as regular, or nearly so, in their visits as *H. oblivia*, though fewer in numbers. It is hardly possible, in fact it is impossible, that one individual could see all that happened every year, even in this small way and though but in a single district; still I think I am not far from the mark. It will be as well, however, in the meantime, perhaps, to look upon *H. medusarum* and *H. minuta*, but especically the latter, as but casual or accidental visitors only. And it is, I believe, during these peregrinations that on coming too near the land so many of them, as in the case of *H. oblivia*, are occasionally washed in and destroyed.

Lestrigonus Kinahani and *Hyperia galba* generally appear here about the beginning of July, and disappear again towards the end of September; *H. oblivia* usually about August, and continues till spring; *H. medusarum* in December, and remains till March (on one occasion I took two of this species as late as the month of May); and the time I found *H. minuta* was from October to December. During these periods, too, I have never failed to find the females of all, save the first, to contain, in some cases eggs, in others well-developed young. With reference to *H. oblivia*, I not unfrequently find females of this species with young from September to January, thus extending over a period of five months.

Although I have taken *H. oblivia* from the stomachs of different species of fish besides the herring, I have never yet found any of the other in a heterogeneous repository of the kind.

There is yet another circumstance which I would here mention, as being, in some measure, in connexion with my subject. Of itself, however, it may be of little or no value, but when taken in conjunction with the others will, I trust, be at least found worthy of record. It is that, during some seasons when the *Medusæ* were very plentiful, I have noticed that the *Hyperiæ* (I here allude only to *L. Kinahani* and *H. galba*) would be remarkably few, and *vice versâ.* And during no season, within my recollection, has this been so much and so strikingly the case as in the present (1866), the *Medusæ* having been far more numerous here than ever they were known before. Now, and from this circumstance, there are many, no doubt, who would have expected that at least a portion of the Hyperiidæ would be equally abundant.

But what was really the case? Why, scarcely any *Hyperiæ* at all—that is, so far as I have observed. True, I have not been able, from ill health, to look after the matter so much, nor give it the attention, this summer, that I should have liked; still I have been out; and had they been there, I do not think they could have escaped my notice.

It chanced that one day in July, and two in August, great hordes of the *Medusæ* were cast in upon our beach; and out of many hundreds of these, which I had the satisfaction of examining, and that carefully too, I only got seven *Hyperiæ*—one *L. Kinahani*, and six *H. galbæ*. The first was adult, but none of the others. Two, on these occasions, were the most found in a single *Medusa*. Thus these seven, and about thirty others which I obtained free, are all my season's take—that is, of these two species—making in all about two score. Yes, only two score, and that, too, when, as I have already stated, the *Medusæ* were in such prodigious shoals that they were never known to be so numerous in this part of the sea before.

On the other hand, I have met with *L. Kinahani* and *H. galba* very plentiful whilst not a *Medusa* was to be seen and there was perhaps not one in this part of the Firth.

Such, then, are a few and rather briefly told facts concerning these curious and interesting creatures—a genus whose true habits and economy seem, as yet, to be but little understood. And if I have been able to add to their general character even but one single fact not hitherto known, I shall consider myself well rewarded for my time and labour—a labour which is to me at all times a pleasant occupation.

Experimental Investigations with Cestoid Entozoa. By T. S. Cobbold, M.D., F.R.S., F.L.S., Lecturer on Comparative Anatomy at the Middlesex Hospital.

[Read Nov. 1, 1866.]

Having from time to time in conjunction with Professor Simonds carried on a series of experiments which (so far, at least, as I was concerned) were originally promoted by a small grant of money placed at my disposal by the General Committee of the British Association, the present record may, in some sense, be regarded as a continuation of our joint Paper communicated to the Royal Society*. During the past year, however, the incessant demands on Mr. Simonds's time (occasioned by the rinderpest epidemic) have left him so little leisure that he has desired me to make use, in any way which I might think fit, of the results thus unitedly obtained. I may remark that the procuring and selecting of our experimental materials (such as trichinous flesh and tapeworm-proglottides) generally devolved upon myself, whilst, on the other hand, the actual administrations were made either by Mr. Simonds or by Mr. Pritchard, the Assistant Professor and Anatomical Demonstrator at the Royal Veterinary College. On these occasions other persons, as well as myself, sometimes rendered aid. I may likewise add that I do not here record certain experiments which Mr. Simonds conducted independently, but only those for which I may rightly be considered exclusively responsible.

Tænia mediocanellata.—Exp. 1. This successful case, in which about 8000 tapeworm-larvæ were reared in a calf, is already fully reported in the Proceedings of the Royal Society for May 4, 1865, No. 75, vol. xiv. p. 214.

Exp. 2. Four separate worm-feedings were administered to a calf, namely 50 sexually mature proglottides of *T. mediocanellata* on the 13th of April (1865), 160 proglottides on May 16th, 120 proglottides on June 1st, and a final hundred on the 17th of the last-named month. Mr. Simonds states that this animal gave no evidence of helminthic symptoms. On the 2nd of September it was attacked with with rinderpest, and died in 36 hours. I had not myself an opportunity of examining its flesh, and Mr. Simonds failed to detect any cysticerci in the muscles.

Exp. 3. In this case the experimental animal was a fine healthy Dutch heifer, about two years old. On the 3rd of March she swallowed 90 proglottides given in tepid water. On the 15th of the same month 108 proglottides were also administered. On the 5th of April another 100 joints were given; and for a few days after she seemed rather restless, bellowing occasionally. No other symptoms having followed, on the 13th of the succeeding April I made a very careful selection of 200 ripe proglottides, from specimens which I had that day received from Birmingham, through the kindness of Dr. Fleming. For some some days the restlessness appeared to increase slightly, and the bellowing continued. In addition there were certain peculiarities of manner which convinced Mr. Simonds (who watched the animal almost daily) that we had here, at least, a feeble development of those symptoms of the "acute cestode tuberculosis" which were so strongly marked in our first experiment on a calf. There was the same vacant stare, a dull expression of the eye, slight arching of the back, and stretching of the limbs. However, the heifer never lost her appetite, and, strange to say, whilst all the cattle near her were attacked by (and most of them died of) the rinderpest, she entirely resisted its invasion. In about a week all the measle-symptoms passed off, and in course of time the animal attained the proportions and aspect of a large, healthy, three-year-old cow. It was not until the expiration of rather more than a year from the time of our first feedings, namely on the 4th of April 1866, that the beast was slaughtered. With Mr. Pritchard's assistance I made a very careful dissection and examination of the beef thus obtained; nor was it until I had subjected the muscles for many minutes to a very close and careful scrutiny (with the aid of a pocket-lens) that I succeeded in detecting evidence of the successful character of our experiment. The result was most interesting, especially since none of the previously recorded experiments (either by ourselves or those previously instituted by Leuckart and Mosler) had extended over such a period of time. Here the only indication of the presence of measles was shown by the existence of extremely minute calcareous specks, larger, it is true, but by no means so conspicuous as ordinary *Trichina*-capsules. They presented the aspect of sparsely scattered yellowish points without any definite outline or any other character likely to catch the eye. It is even difficult to see them in sections of the flesh which I have expressly preserved to show them. Microscopic examination affords evidence of the remains of a small cyst; but all trace of the measle itself is entirely lost. Each cysticercus had become, as it were, resolved into a more or less amorphous, solid, friable, crystalline particle, whose true characters (as presented to the naked eye) were obscured by a closely investing and remarkably contracted cyst, the external surface of the latter becoming insensibly blended with the ordinary intermuscular connective tissue. By a little care, however, the calcareous particles could be perfectly isolated from their cysts. They were numerous and, owing to the deeper colour of the muscular substance, most easily found in the diaphragm. In other muscles they were, perhaps, equally abundant, but it was a great labour to find them. Assuming them to have been pretty equably distributed throughout the muscular system, there could not have been less than 12,000 of these degenerated measles in the animal. I have no hesitation in saying that, if there had been 12,000,000 of these measles, no butcher would ever have noticed them; but, fortunately, in this condition their ingestion could do no possible harm. In point of fact, the flesh of the animal has since been entirely eaten; and healthier beef I never saw. Even in their perfect, non-degenerated state, the beef measles are readily overlooked; and until recently no person besides Mr. Simonds, Mr. Pritchard, and myself, and those who assisted us, had even seen them in this country. The experiment now recorded is the first in which the natural process of cure has been traced; and it is of great practical importance, inasmuch as it proves to demonstration that a period of ten or twelve months is fully sufficient to ensure the natural death (by calcareous degeneration) of the smaller tapeworm-larvæ which reside in cattle. This is a positive contribution to our knowledge of the life-economy of these smaller cysticerci, and it serves to fix the period of their larval activity. All the entozoa, in their juvenile stages, whilst occupying the flesh of man and animals are liable to be affected by this law of calcareous degeneration; but the actual time required to bring about the death of the parasite varies considerably in different species.

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* "On the Production of the so-called 'Acute Cestode Tuberculosis' by the administration of the Proglottides of *Tænia mediocanellata*."

Tænia serrata.—Exp. 1. Three examples of the pea-shaped hydatid (*Cysticercus pisiformis*) were removed from the abdominal viscera of a recently killed rabbit. Two of them were rather more perfectly developed and larger than the third. The rabbit harboured no others. These three cestode larvæ were administered, on the 25th of January 1865, to a healthy puppy, reared at the Veterinary College and nearly twelve weeks old. Five days subsequently, namely on the 30th of the same month, the puppy was destroyed. In the alimentary canal I found three young *Tæniæ*, and three only. Two of them were severally about 1 inch in length, the third being a trifle shorter and not quite so large. These sexually immature tapeworms presented all the true characteristics of *T. serrata*, and their degree of development was in exact accordance with my previous experiences in this relation. The more feeble development of the third tapeworm proved its genetic connexion with that larva which at the time of the worm-administration was noticed and recorded as being rather incompletely de veloped. The experiment was a perfect success.

Exp. 2. On the 25th of January, 1865, a second rabbit was destroyed, for the purpose of procuring additional tapeworm-larvæ.

In this rabbit I only found one solitary and perfect *Cysticercus pisiformis*—a somewhat unusual circumstance. Mr. Simonds placed this larva in a small piece of paper, and in the form of a bolus gave it to a little puppy which belonged to the same litter as the former, being readily distinguished by its black ears. We did not destroy this whelp until the 7th of the following February, thus allowing a period of thirteen days to elapse for the development of the solitary *Tænia serrata* which we desired to rear from the cysticercus. Mr. Simonds, as usual, requested me to examine the alimentary canal; and I had the satisfaction of removing the solitary *Tænia serrata* we had thus successfully reared. It was just 6 inches in length, showing the same correspondency as to growth, in respect of time, which my previous and independent experiences with the artificial method of rearing this parasite had invariably supplied. The proglottides were still immature, but the cephalic development was in all respects complete.

Tænia marginata.—On the 28th of January, 1865, Mr. Simonds removed fourteen specimens of the so-called slender-necked hydatid from the omentum and surrounding viscera of a hogget. Five of these large cysticerci (*C. tenuicollis*) were administered to the mother of the two whelps above referred to. They were swallowed entire, without any additional material. This dog was killed on the 7th of the following February, thus allowing only ten days for the development of the corresponding adult tapeworms. As usually happens in all old dogs, we found in the intestinal passages many examples of the extremely common cucumerine tapeworm (*T. cucumerina*); but these of course could have no genetic relation to the tapeworm-larvæ, which latter were already known to be the offspring of an entirely different species of cestode parasite. Our experiment, indeed, was a perfect success; for, in addition to the cucumerine tapeworms (of which there were fifteen mature specimens of variable size and growth), I found in the duodenal portion of the intestinal canal five young and sexually immature examples of the *Tænia marginata.* These were of uniform size and severally 1 inch in length. Not a shadow of doubt could be entertained as to their relation to the five cysticerci which had been administered. Their specific characteristics, uniform development, degree of growth, and separate location in the canal, pointed unequivocally to the source whence they had been derived. Here again, therefore, previous experiences received abundant confirmation.

Tænia cœnurus.—Exp. 1. On the 15th of March, 1865, Mr.

Simonds received (from Messrs. Caudwell, of St. Neots) the head of a "giddy" sheep which had been killed two days previously. On examination the brain was found to contain a perfect polycephalous hydatid (*Cœnurus cerebralis*) which, it was estimated, supported about 150 scoleciform processes, or larval tapeworm-heads. It was removed entire, and given by Mr. Simonds to a dog, which swallowed the parasite readily in its unbroken condition. Only five days subsequently, namely on the 20th of March, the experimental animal was destroyed; and here again a complete success attended our experiment. A careful examination of the alimentary mucus enabled me to extract a large number of extremely minute tapeworms, of so small a size that they were scarcely visible to the naked eye. Though only the heads and necks were developed, their characters corresponded with what was hitherto known of the head and neck of *Tænia cœnurus*, to which species they were undoubtedly referable. Their number appeared to correspond precisely with the number of scoleces attached to the common "gid" vesicle; but no attempt was made to collect every specimen, as that would have involved an immense amount of unnecessary labour. All trace of the vesicle common to the colony of "heads" had disappeared, the necks of the scoleces, detached by digestive action, having become rounded off and more or less pointed (according to the degree of contraction shown by each specimen while under microscopic examination).

Exp. 2. On the 6th of April, 1865, a similar administration, with a brain-hydatid furnished with about 100 cephalic processes, was performed on a stray dog. Two days subsequently, however, the animal was claimed by its rightful owner, and we had therefore, in this instance, no opportunity of ascertaining the result of our experiment.

Exp. 3. On the 25th of April Mr. Simonds received (from Mr. Mackinder, of Peterborough) the head of a sheep affected with "gid." The brain was found to contain three *T. cœnuri*. One of these, furnished with numerous heads, was given to a large half-bred lurcher dog. On the 16th of the following May the animal was destroyed, thus permitting twenty-one days for the development of the slow-growing *Tænia cœnurus*. As too often happens in the case of old dogs, the digestive passages were found loaded with a great variety of tapeworms; nevertheless it was here again quite easy for us to distinguish between the parasites which had been introduced by our experiment and those which had gained access to the canine "bearer" without our aid. Thus there were found in this "Lurcher" several examples of the large *Tænia marginata*, six or eight specimens of *Tænia serrata*, and a few examples also of *T. cucumerina*. There were likewise some half-dozen nematodes (*Strongyli*). In addition to all these, however, there were a multitude of small tapeworms (of the species *T. cœnurus*), the longest of which did not exceed one inch and a half in length, sexually immature, and manifestly corresponding with the numerous scoleces artificially introduced. Again, therefore, despite the inconveniences always liable to attend administrations of this kind on old dogs, we had abundant proof of the success of our experiment.

Exp. 4. On the 25th of April, 1865, another of the two remaining *T. cœnuri* just mentioned was given by Mr. Simonds to a smaller dog. This hydatid was also well furnished with cephalic processes (or larval tapeworm-heads). In this case the experimental animal was not killed until more than two months had elapsed from the time of the worm-administration. On the 29th of the following June we made the necessary examination. Again we were successful. The intestinal canal contained large numbers of the *Tænia cœnurus*, there being no other kinds of entozoa present. The experiment was therefore even more satisfactory than the previous one. The largest specimens measured about 18 inches in length; but when I examined their proglottides, the contained eggs were still not quite perfectly developed. The primitive yelk-sacs and superfluous granular yelk masses were very conspicuous, but the true chorional envelope was only in the act of forming. The swallowing of the ova in this imperfect stage would lead to no result. Probably another week or ten days would have sufficed to render all these *Tæniæ* sexually mature.

Exp. 5. On the 8th of July, 1865, a large *T. cœnurus* was given to a terrier, which was also subsequently fed with trichinous flesh. This animal died on the 2nd of August of the present year, but unfortunately neither Mr. Simonds nor myself had any opportunity of examining the contents of its viscera. A portion of its muscle-flesh was sent to me for microscopic examination, and this I found to contain encysted *Trichinæ*.

Tænia echinococcus.—On the 23rd of June, 1865, I sent several fresh *echinococcus*-hydatids to the College, which were on the same day administered to a dog by Professor Simonds. By an oversight this animal was not destroyed until the 18th of August, 1866, when, as regards the *Tænia echinococcus*, we obtained only a negative result. This dog was likewise the subject of a *Trichina*-experiment in which we were entirely successful. It also harboured eleven specimens of *Ascaris marginata*, and many examples of *Tœnia cucumerina*; these, of course, were introduced by natural causes.

Tœnia solium.—The only two cestodes which I have hitherto not succeeded in rearing are the present and foregoing species. My non-success in the former case I can very readily explain—not so in the latter. Negative results, however, oftentimes prove highly instructive; and it is, even here, just possible that I may have hit upon the true explanation of my non-success in the case of *Tœnia solium.* At all events it is but fair to place the facts on record.

Exp. 1. On the 30th of January, 1865, and on the 23rd of the following February, numerous tapeworm-proglottides were given to a pig, which afterwards displayed no measle-symptoms. It was destroyed on May 16th, 1865, and on examination yielded no cysticerci. Most, if not all of the "joints" first given, I subsequently ascertained to be those of *Tœnia mediocanellata*, whilst those of the second feeding were from what I had previously described at the time as a "very small variety of *Tœnia solium.*" I now believe the latter to have represented neither *T. solium* nor *T. mediocanellata*, but an altogether distinct and new-form cestode. If this conjecture turn out correct, the explanation of this non-success is sufficiently obvious.

Exp. 2. On the 30th of January, 1865, some of the same experimental material was given by Mr. Simonds and myself to another pig. On the 15th of March following, seventy proglottides of a *T. solium* (which I fear had been placed in spirit before transmission to me) were also administered, and again, on the 13th of April, not less than 200 proglottides of my so-called small variety of *T. solium* were likewise introduced. In this case the small "joints" were transmitted to me by Dr. Alexander Fleming, of Birmingham, along with other parasites, to which I have elsewhere referred. The pig was killed on the 30th of May, 1865, and the result was again negative. The explanation of our non-success is similar to that I have assumed to hold good in the previous case. The March feeding, certainly, might have yielded *Cysticercus cellulosæ*, but I never could ascertain who sent me the parasite, and I had not a little reason for believing that the parasite had been immersed in alcohol. My previous experiences had shown that even a comparatively weak spirit-solution effectually destroys the vitality of the ova and their contained six-hooked embryos.

Exp. 3. On the 30th of May, 1865, thirty proglottides, and on the 17th of the following June, fifty more (the parasite, in each case, being subsequently ascertained to belong to the species called *Tænia mediocanellata*) were given to a young pig. Again, on the 22nd of June, same year, I had the satisfaction of procuring (through the kindness of Dr. M'Kendrick, Physician to the Leman-street Dispensary, London) sixty perfect, fresh, and fully mature segments of an undoubted example of *Tænia solium*. These were administered to the pig by Mr. Simonds without any delay. In this case, therefore, I had every reason to anticipate a successful result. The animal was not killed, however, until the 4th of April, 1866 (the same day as that on which the heifer was slaughtered), when no traces of any measles were detected. If, as I think quite possible, measles had developed themselves and subsequently undergone calcareous degeneration, the pale colour of the pig's flesh may have prevented my detecting them. But for the dark colour of the muscular tissue, in the case of the heifer, I certainly never should have detected the degenerated beef-tapeworm-larvæ. At all events this is the only explanation I can offer. The experiment, as regards its results, had certainly been allowed to stand over too long.

In conclusion, it may be remarked that, notwithstanding this want of success in respect of the two last-named species, we have every reason to be satisfied with the results obtained in the cases of *Tænia mediocanellata*, *T. serrata*, *T. marginata*, and *T. cœnurus*.

In addition to the above-recorded experiments with *T. mediocanellata*, it may be mentioned that we gave a sheep a single "feeding," consisting of forty proglottides of this tapeworm; but from the negative experiences previously obtained by Leuckart in this relation, I felt sure that we could only get a similar result. The recent discovery of measles (furnished with hooks) in mutton by Mr. Charles Heisch, F.C.S., and also, independently, by myself, has inclined me to look for a third and distinct species of tapeworm as the progenitor of the armed mutton-measle. I have already remarked, in the appendix to my recent practical work on "Tapeworms" (p. 83), that the species in its adult state may turn out to belong to one of the higher carnivora, and not to man. Lastly, I may add that Mr. Simonds and myself have conducted a number of experiments with *Trichina*, the results of which I shall lay before the Society shortly.

On *Pauropus*, a New Type of Centipede. By Sir JOHN LUBBOCK, Bart., V.P. Linn. Soc., Pres. Ent. Soc., V.P. Ethn. Soc., F.R.S., &c.

[Read December 6, 1866.]

THE subject of the following communication is a small, white, bustling, intelligent, little creature, about $\frac{1}{25}$ of an inch in length, and may be characterized as follows:—

Body composed of ten segments, including the head, convex, with scattered hairs. Nine pairs of legs. Antennæ 5-jointed, bifid at the extremity, and bearing three, long, jointed appendages.

The author has met with this little Centipede in some numbers, among Thysanura, &c., in his kitchen-garden. He was at first disposed to regard it as a larva; but having, during the last three months, had several hundred specimens under examination without finding any in a more advanced condition, and having found spermatozoa in several, he thought there could be no doubt that it is a mature form.

The body is rather narrower in front. The head consists of two segments; the third segment bears one pair of legs; the fourth, fifth, sixth, and seventh two pairs each. Strictly speaking, however, each of these segments is double. The posterior legs are the longest. Each segment, from the third to the seventh, has on the side a pair of strong bristles. There are also several transverse rows of short club-shaped hairs. The eyes are large and oval. The antennæ are very remarkable, and quite unlike those of any other Myriapods. They are 5-jointed and bifid at the extremity. The first four segments are short. The two branches constituting the fifth are longer and unequal. One bears a single appendage, the other two, long, many-jointed appendages. The mouth consists of two pairs of minute organs; the anterior ones toothed, the posterior pointed. Between the second pair of legs are two processes, which probably form part of the generative organs.

The author has been able to trace the development. The smallest specimens met with have three pairs of legs, and the number increases at each moult; but it is remarkable that whereas two pairs are acquired in the first, so that the number rises from three pairs to five, at the subsequent moults a single additional pair only is obtained.

A second species of the genus was found with the first. It is, however, much rarer, and differs in the form of the antennæ.

Sir John then proceeded to make some remarks on the systematic position of the Myriapoda, which he regarded as forming a class, and he expressed the opinion that the genus now described approached the other Articulata more nearly than any Myriapod hitherto known. Nor did he think that *Pauropus* could be placed in either of the two great groups of Myriapoda, which may be characterized as follows :—

CHILOPODA. Antennæ with not *fewer* than fourteen segments. One pair modified into powerful footjaws. Generative organs opening at the posterior end of the body. Legs in single pairs.

DIPLOPODA. Antennæ with not *more* than seven segments. No footjaws. Generative organs opening at the anterior part of the body. Legs, after the first six, arranged in double pairs.

Pauropus, at first sight, looks most like a Chilopod. Its activity, the compactness of its body, the dorsal plate, and elongated hind legs give it much the appearance of a very minute *Lithobius*. A closer examination, however, does not favour this view. The antennæ have only five segments; the powerful footjaws are absent; and the generative organs appear to open anteriorly.

Nor can *Pauropus* be classed among the Diplopods. It is true that the eight posterior legs correspond to four dorsal plates; nevertheless it is evident that in reality each pair belongs to a separate segment, as may clearly be seen if we look at the animal from beneath. In one sense, this is true also of the Diplopods; but they invariably have the legs attached by double pairs, while those of *Pauropus* are equidistant. Moreover, in all Diplopods the first three pairs of legs are distinguished from the rest by possessing each a distinct segment, whereas in *Pauropus* this is the case with the first pair only. In Diplopods, again, the legs are equal, and terminate in a simple claw, which is not the case in *Pauropus*. The mouth-parts, though very different from those of the Chilopods, are perhaps even less like those of the Diplopods. The eyes and antennæ are also very different.

Thus, then, *Pauropus* differs greatly from either of the two great orders of Centipedes. It forms a connecting link not only between the Myriapods and other Articulata, but also between the Chilopoda and Diplopoda.

Characters of some undescribed Heterocerous Lepidoptera. By Francis Walker, Esq., F.L.S.

[Read June 7, 1866.]

All the following species were discovered at Bogota, and are in the collection of E. Birchall, Esq., who has kindly allowed me to describe them.

The descriptions are preceded by a list of the species, and by a few remarks on some of the families and genera in which the species are included.

Tribe Noctuites.
Fam. HEMICERIDÆ.
Gen. Hemiceras, *Guen.*
H. subochraceum.
Fam. HOMOPTERIDÆ.
Gen. Homoptera, *Boisd.*
H. fimbripes.
H. paupera.
Fam. CATEPHIDÆ.
Gen. Vespola, n.
V. cæruleifera.
Fam. PHYLLODIDÆ.
Gen. Tetrisia, n.
T. florigera.
Fam. EREBIDÆ.
Gen. Brujas, *Guen.*
B. bigutta.
Gen. Letis, *Hübn.*
L. securivitta.
Gen. Syrnia, *Hübn.*
S. albifimbria.
Fam. OMMATOPHORIDÆ.
Gen. Allia, n.
A. ocellata.
Gen. Erymella, n.
E. hieroglyphica.
Fam. OPHIUSIDÆ.
Gen. Varia, n.
V. rubiginea.
Fam. POAPHILIDÆ.
Gen. Phurys, *Guen.*
P. teligera.
Gen. Batia, n.
B. squamicosta.
Fam. THERMESIADÆ.
Gen. Thermesia, *Hübn.*
T. bipustulata.
Gen. Mandela, n.
M. crocea.
Tribe Deltoidites.
Fam. HYPENIDÆ.
Gen. Hypena, *Schr.*
H. megaspila.
Gen. Lametia, *Walk.*
L. retusa.
Fam. HERMINIDÆ.
Gen. Casperia, n.
C. erebipennis.
Tribe Geometrites.
Fam. URAPTERYDÆ.
Gen. Chærodes, *Guen.*
C. bogotaria.
Gen. Clysia, *Guen.*
C. discolor.
Fam. ENNOMIDÆ.
Gen. Azelina, *Guen.*
A. saturata.
Fam. ŒNOCHROMIDÆ.
Gen. Norsia, n.
N. vincta.
Fam. BOARMIDÆ.
Gen. Boarmia, *Treit.*
B. demissaria.
Fam. ACIDALIDÆ.
Gen. Acidalia, *Treit.*
A. fulvicosta.
Fam. MICRONIDÆ.
Gen. Micronia, *Guen.*

M. metargyria.
Fam. FIDONIDÆ.
Gen. Issa, n.
I. munda.

Fam. EMPLOCIDÆ.
Gen. Tora, n.
T. unilinea.

Fam. HEMICERIDÆ.

Hemiceras, the typical genus of this family, is wholly American, and extends from Canada to Brazil. The species here described has much affinity to *H. metastigma*; but the latter has white hind wings.

Fam. HOMOPTERIDÆ.

The genus *Homoptera* is mostly American, and the species are very numerous. The two species here described are much smaller than most of the others in the genus.

Fam. CATEPHIDÆ.

Some of the genera included in this family are very different from each other in structure. The new genus *Vespola* has most affinity to *Stictoptera* and to *Lophoptera*, but may be distinguished by the slender and very long palpi.

Fam. PHYLLODIDÆ.

Tetrisia has a remarkable resemblance to the Asiatic genus *Phyllodes*, from which it may chiefly be distinguished by the great length of the 3rd joint of the palpi.

Fam. EREBIDÆ.

The Erebidæ exceed in size all the other Noctuites; and the South-American species are larger and much more numerous than those of Asia. The Bombycites and the Geometrites have the greatest development in South Asia; and the Tineites of Australia and of New Zealand, including the Cossidæ and the Hepialidæ far surpass all others in dimensions.

The sameness of colouring in the wings of *Brujas biqutta*, and the white dot near the interior angle of the fore wings, distinguish it from *B. basicincta*, *B. Rengus*, and *B. posterior*. *Letis securifera* has most resemblance to *L. occidua*, from which it is chiefly distinguished by the testaceous patch on the interior angle of the fore wings, and by the fewer markings on the hind wings.

The white fringe of the wings and the more angular hind wings distinguish *Syrnia albifimbria* from *S. Iphianassa*.

Fam. OMMATOPHORIDÆ.

This family is especially Asiatic; and the two new genera here characterized recede much from the typical structure. The very long 3rd joint of the palpi is the chief distinctive character of *Allia*. *Erymella* hardly belongs to the Ommatophoridæ.

Fam. OPHIUSIDÆ.

The woolly covering of the pectus, of the base of the abdomen beneath, and of the legs distinguishes *Varia*. It may be considered an aberrant form of the Ophiusidæ.

Fam. POAPHILIDÆ.

Phurys teligera differs very much from all the other species of the genus; it is most like *P. basilaris*, but there is no longitudinal streak near the base of the fore wing.

The curved palpi and the structure of the fore wings distinguish *Batia* from *Poaphila* and from *Phurys*.

Fam. THERMESIDÆ.

Thermesia bipustulata is nearly allied to *T. prospera*; but the wings are without the postmedial white line which characterizes the latter species.

Mandela has most affinity to *Ephyrodes*; but the wings are festooned, and the exterior border of the hind wings is not angular.

Fam. HYPENIDÆ.

Hypena megaspila is most allied to *H. pilosalis*; but the latter has no concise silvery line along the patch of the fore wings.

The more porrect tips of the fore wings distinguish *Lametia retusa* from *L. ignitalis*. *Plusiodonta anaitoides* (Cat. Lep. Het. xxxiii. 843) may be transferred to this genus.

Fam. HERMINIDÆ.

In this family *Casperia* belongs to a distinct group, of which *Mesopia* is the only other representative. *Mastygophora* and *Palthis* are the types of two neighbouring groups.

Fam. URAPTERYDÆ.

The genus *Chærodes* extends from Nova Scotia to Rio Janeiro. *Clysia* is a South-American genus; and *C. discolor* has a general resemblance to *C. pardipennaria*, but there are no black spots on the wings.

Fam. ENNOMIDÆ.

The section of *Azelina* here described includes *A. variaria* and *A. honestaria.*

Fam. ŒNOCHROMIDÆ.

Norsia has some affinity to *Auxima*; and these two genera hardly belong to the Œnochromidæ, for they are very different in structure from the Australian groups of that family.

Fam. BOARMIDÆ.

Boarmia demissaria is described in the Catalogue of Lepidoptera Heterocera, xxi. 357; but the specimen there mentioned was injured, and the description is consequently incomplete.

Fam. ACIDALIDÆ.

The genus *Acidalia* is exceedingly numerous in species, and inhabits all parts of the world. *A. fulvicosta* is very distinct from all the other South-American species.

Fam. MICRONIDÆ.

The genus *Micronia* extends from West Africa through Hindostan, Ceylon, and China to Australasia and Australia; it has no known representative in South Africa. *M. metargyria* is the only American species yet known, and is most allied to the West-African *M. erycinaria*; it has also some affinity to *Meleaba theclaria*, the type of a neighbouring South-American genus.

Fam. FIDONIDÆ.

The structure of the palpi and of the antennæ will distinguish the genus *Issa* from *Pachydia*, to which it has some resemblance.

Fam. EMPLOCIDÆ.

Tora, the new genus here described, is quite different from *Emplocia* in the structure of the wings.

HEMICERAS SUBOCHRACEUM. *Mas.* Rufescenti-cervinum, capite bifasciculato, palpis erectis articulo 3° minimo, antennis dimidio basali subpectinatis; alis anticis lineis duabus nigricantibus angulosis valde indeterminatis, linea exterioree punctis nigris cinereo marginatis; alis posticis flavescenti-cinereis, fascia marginali lata rufescenti-cervina.

Male. Reddish fawn-colour, yellowish cinereous beneath. Head with a small erect tuft on each side between the antennæ. Palpi stout, pubescent, erect, not rising higher than the vertex; 3rd joint extremely small. Antennæ slightly pectinated to nearly the middle. Abdomen slightly tufted above near the base, extending somewhat beyond the hind wings; apical tuft compressed, very small. Legs stout; femora and tibiæ pilose. Fore wings with two zigzag very indistinct blackish lines and with an exterior more oblique line of black cinereous-bordered points. Hind wings yellowish cinereous, with a broad reddish fawn-coloured marginal band. Length of the body 11 lines; of the wings 24 lines.

HOMOPTERA FIMBRIPES. *Mas.* Fusca, fasciculo frontali acuto; palpis suberectis verticem longe superantibus, articulo 3° lanceolato; tarsis late fimbriatis; alis fascia nigra undulata e lineis tribus approximatis, lineis duabus exterioribus nigricantibus angulosis indistinctis; alis anticis fascia antemedia e lineis tribus approximatis.

Male. Brown, cinereous beneath. Frontal tuft prominent, acute. Palpi nearly erect, rising much higher than the vertex; 3rd joint lanceolate, cinereous at the base and at the tip, rather shorter than the 2nd. Antennæ setose. Thorax squamous. Abdomen extending much beyond the hind wings; apical tuft small. Tibiæ broadly fringed. Wings with a middle undulating black band, which is composed of three approximate lines; two exterior indistinct zigzag blackish lines; marginal points black. Fore wings with a band near the base like the one before mentioned. Length of the body 7 lines; of the wings 16 lines.

HOMOPTERA PAUPERA. *Fœm.* Fusca; palpis erectis verticem longe superantibus, articulo 3° lanceolato; alis spatio marginali obscuriore, fascia median igricante angulosa; alis anticis fascia antemedia angulosa.

Female. Brown, cinereous beneath. Palpi erect, rising much higher than the vertex; 3rd joint lanceolate, much more slender than the 2nd, and little more than half its length. Wings with a middle zigzag blackish band; space along the exterior border darker than the ground-hue; marginal points black. Fore wings slightly acute, with a blackish band near the base; exterior border slightly rounded, hardly oblique. Length of the body 5 lines; of the wings 13 lines.

Gen. VESPOLA.

Mas. Corpus sat validum. *Palpi* graciles, oblique ascendentes, verticem sat superantes; articulus 2^{us} subarcuatus; 3^{us} rectus, linearis, 2° paullo brevior. *Abdomen* alas posticas dimidio superans; fasciculus apicalis parvus. *Pedes* robusti, squamosi; calcaria longa, gracilia. *Alæ* anticæ elongatæ, acutæ, margine exteriore perobliquo.

Male. Body moderately stout. Palpi slender, obliquely ascending, rising rather higher than the vertex, much longer than the breadth of the head; 2nd joint slightly curved; 3rd straight, linear, a little shorter but hardly more slender than the 2nd. Abdomen extending for half its length beyond the hind wings; apical tuft small. Legs stout, squamous; spurs long, slender. Wings elongate, moderately broad. Fore wings acute; exterior border slightly convex, very oblique.

VESPOLA CÆRULEIFERA. *Mas.* Cupreo-ferruginea, abdomine plagis duabus lateralibus cyanescenti-argenteis plagaque basali ventrali alba; alis anticis pallidiore subvariis, linea angulosa postmedia atomisque argenteis, subtus cyaneo plagiatis; alis posticis disco cyaneo.

Male. Cupreous-ferruginous. Abdomen with a large bluish silvery patch on each side, and with a large white patch at the base beneath. Joints of the tarsi with white tips. Fore wings slightly mottled with a somewhat paler hue, irregularly adorned with silvery speckles and with a postmedial zigzag line of the same hue; underside with patches of bright blue scales. Hind wings bright blue in the disk, this hue more prevalent on the underside. Length of the body 8 lines; of the wings 17 lines.

Gen. TETRISIA.

Fœm. Corpus robustum. *Frons* conicus. *Proboscis* brevis. *Palpi* validi, pubescentes, oblique ascendentes, verticem longissime superantes; articulus 3^{us} subclavatus, subfimbriatus, 2^{o} paullo longior. *Antennæ* sat graciles. *Abdomen* alas posticas paullo superans, basi subtus dense pilosum. *Pedes* robusti; femora pilosa; calcaria longa. *Alæ* amplæ; anticæ, acutæ, costa perparum convexa, margine exteriore perobliquo.

Female. Body stout. Front prominent, conical. Proboscis short. Palpi stout, pubescent, obliquely ascending, rising very much higher than the vertex; 3rd joint subclavate, slightly fringed above, a little longer than the 2nd. Antennæ rather slender. Abdomen tapering from the base to the tip, densely pilose near the base, extending a little beyond the hind wings. Legs stout; femora pilose; spurs long. Wings long, broad. Fore wings acute; costa very slightly convex; exterior border slightly convex, very oblique; 2nd inferior vein as near to the 3rd as to the 1st; 4th remote from the 3rd.

Tetrisia florigera. *Fœm.* Obscure fusca; alis anticis lunula media nigra, fascia exteriore obliqua e maculis nigricantibus, macula subtus alba maxima; alis posticis nigris, macula maxima rosea.

Female. Dark brown. Body a little paler beneath. Fore wings with a black lunule at the end of the areolet, and with an oblique band of irregular blackish spots at half the length between the lunule and the exterior border; underside with a very large white spot near the interior angle. Hind wings black; a very large rosy spot near the interior angle, equally apparent on the underside. Length of the body 18 lines; of the wings 45 lines.

Brujas bigutta. *Mas.* Fusca; alis fascia marginali subpallidiore, lineis tribus angulosis lunulisque submarginalibus nigricantibus, his albo marginatis; alis anticis macula postica alba, orbiculari nigricante cinereo marginata, reniformi cinereo marginata lituras duas nigricantes includente.

Male. Brown, cinereous brown beneath. Palpi erect, rising very much higher than the vertex; 2nd joint with a very short fringe in front; 3rd linear, cinereous at the tip, more slender than the 3rd, but nearly as long. Antennæ setose. Abdomen a little shorter than the interior border of the hind wings; apical tuft compressed, very small. Wings with a slightly paler marginal band; three blackish zigzag lines, of which the 2nd in the fore wings is nearer the outer side of the reniform mark; submarginal lunules blackish, white-bordered on the outer side: underside with a postmedial black zigzag line and with a diffuse blackish submarginal band, which contains a slightly undulating cinereous line; submarginal lunules cinereous-bordered. Fore wings with a white spot near the interior angle; orbicular and reniform marks cinereous-bordered, the former blackish, the latter containing a small blackish mark on each side: underside with two black dots, which represent the orbicular and reniform marks. Hind wings beneath with a black fusiform mark in the areolet. Length of the body 11 lines; of the wings 27 lines.

Letis securivitta. *Fœm.* Cinereo-fusca, thorace fascia postica pallide ochracea; alis anticis vitta strigam latissimam emittente plagaque postica magna pallide ochraceis connexis, orbiculari et reniformi magnis nigricantibus albido marginatis, linea submarginali e strigis nigris, striga subapicali obliqua pallide ochracea; alis posticis fascia cervina lineas duas nigricantes denticulatas albo marginatas includente, linea exteriore subundulata pallide ochracea.

Female. Brown, cinereous-tinged. Palpi erect, rising very much higher than the vertex; 2nd joint with a short thick fringe in front; 3rd linear, slender, rather shorter and very much more slender than the 2nd. Antennæ minutely setulose. Thorax with a pale ochraceous band on its hind border. Wings beneath with three pale ochraceous lines in the middle and with a black point in the disk nearer the base. Fore wings with a pale ochraceous stripe, which joins the band of the thorax and emits an extremely broad streak to the costa, and is connected with a large pale ochraceous patch, which joins the interior angle; this stripe is traversed by two oblique zigzag pale ochraceous black-bordered lines, of which the 2nd is white near the interior border; orbicular and reniform marks large, blackish, whitish-bordered; a black submarginal line composed of connected fusiform streaks; three white costal points near the tip, and an oblique undulating pale ochraceous subapical streak. Hind wings with an irregular fawn-coloured middle band, which contains two blackish denticulated partly white-bordered lines, and is bordered on its outer side by an undulating black line; a slightly undulating pale ochraceous line near the submarginal line, which is like that of the fore wings. Length of the body 16 lines; of the wings 58 lines.

SYRNIA ALBIFIMBRIA. *Fœm.* Obscure fusca; alis lineis tribus nigricantibus angulosis cinereo marginatis, linea exteriore nigra dentata ochraceo marginata, linea adhuc exteriore alba indeterminata, fimbria alba basi nigra; alis anticis macula orbiculari et reniformi magnis ochraceo pallido marginatis; alis posticis margine exteriore dentato uniangulato.

Female. Dark brown, pale brown beneath, minutely whitish-speckled. Palpi erect, rising much higher than the vertex; 2nd joint slightly curved, applied to the head, with a short thick dull ochraceous fringe in front; 3rd linear, cinereous at the tip, rather shorter and very much more slender than the 2nd. Antennæ minutely pubescent. Abdomen with a blue tinge, much shorter than the interior border of the hind wings. Tips of the tibiæ and of the joints of the tarsi dull ochraceous. Wings with three blackish zigzag partly cinereous-bordered lines, and with an exterior more distinct black dentate ochraceous-bordered line, beyond which there are traces of a white line; submarginal line black, festooned; fringe white, black at the base: underside with a black antemedial cinereous-bordered spot in the disk, with a postmedial dark-brown slightly undulating partly whitish-bordered line, and with traces of an exterior white line. Fore wings acute; orbicular and reniform marks large, of the ground-hue, bordered with pale ochraceous; exterior border straight. Hind wings with the exterior border dentate, angular in the middle. Length of the body 15 lines; of the wings 42 lines.

Gen. ALLIA.

Mas. Corpus robustum, læve. *Proboscis* mediocris. *Palpi* erecti, verticem superantes; articulus 3^{us} linearis, 2^{o} paullo longior. *Antennæ* setulosæ. *Abdomen* alas posticas non superans; fasciculus apicalis minimus, subcompressus. *Pedes* robusti; femora dense pilosa; calcaria longa. *Alæ* breves, latæ, margine exteriore subobliquo, anticæ subacutæ.

Male. Body stout, smooth. Proboscis moderately long. Palpi smooth, erect, twice as long as the breadth of the head, rising very much higher than the vertex; 3rd joint linear, a little longer and much more slender than the 2nd. Antennæ setulose. Abdomen not extending beyond the hind wings; apical tuft very small, slightly compressed. Legs stout; femora densely pilose; spurs long. Wings short, broad; exterior border convex, slightly oblique; an additional vein in each space between the veins that extend to the exterior border. Fore wings slightly acute.

ALLIA OCELLATA. *Mas.* Ferrugineo-fusca; alis anticis lineis duabus angulosis obscure fuscis, macula reniformi longa angusta fusco marginata, ocello postico nigro punctum album includente ochraceo fuscoque marginato, plaga exteriore chalybea; alis posticis plagis duabus chalybeis, linea submarginali obscure fusca cinereo marginata.

Male. Ferruginous brown, cinereous brown beneath. Wings with two dark-brown lines which are zigzag in the fore wings and undulating in the hind wings. Fore wings with a long narrow dark-brown-bordered reniform mark, which is between the lines, as is also a black ocellus on the interior border; this ocellus has a white point in its centre and an orange border, which latter is bordered with dark brown; a chalybeous patch on the outer side of the ocellus; two dark-brown lines near the base, the 2nd undulating; an abbreviated brown line near the exterior border, very diffuse on its inner side. Hind wings with two chalybeous patches, one between the lines, the other between the 2nd line and a dark-brown cinereous-bordered submarginal line, which is intercepted and forms two black dots where it joins the patch. Wings beneath with a dark-brown point in the disk, with a postmedial denticulated dark-brown line and with black marginal points. Length of the body 9 lines; of the wings 24 lines.

Gen. ERYMELLA.

Mas. Corpus robustum, læve. *Proboscis* mediocris. *Palpi* validi, squamosi, oblique ascendentes, verticem longe superantes; articulus 3^{us} linearis, 2^{o} valde brevior. *Antennæ* pubescentes. *Thorax* tegulis posticis longis truncatis. *Abdomen* alas posticas paullo superans; fasciculus apicalis minimus. *Pedes* robusti; femora fimbriata; calcaria longa, gracilia. *Alæ* elongatæ, sat angustæ, anticæ acutæ; margine exteriore perobliquo.

Male. Body stout, smooth. Proboscis of the usual length. Palpi stout, squamous, obliquely ascending, rising much higher than the vertex; 3rd joint linear, much shorter than the 2nd. Antennæ minutely pubescent. Hind tegulæ of the thorax long, truncate at the tips. Abdomen extending a little beyond the hind wings; apical tuft very small. Legs stout; femora fringed; spurs long, slender. Wings elongate, rather narrow. Fore wings acute; exterior border convex, very oblique.

ERYMELLA HIEROGLYPHICA. *Mas.* Cinereo-fusca, capite thoraceque fuscis; alis linea e punctis albis elongatis, punctis marginalibus nigris; alis anticis spatio basali fusco, linea antemedia obscure fusca, guttis tribus mediis nigris, plaga exteriore magna nigricante.

Male. Cinereous brown. Head and thorax brown. Abdomen and underside brownish cinereous. Wings with a line of elongated white points on the veins, abbreviated on the outer side of the reniform mark in the fore wings; marginal points black. Fore wings with a brown basal space which is limited by a darker brown line; three black dots in the disk, the 2nd on a diffuse dark brown line, the 3rd capitate; a large exterior blackish patch joining the costa. Length of the body 7 lines; of the wings 19 lines.

Gen. VARIA.

Mas. Corpus crassum. *Proboscis* mediocris. *Palpi* breves, erecti, verticem longe superantes; articulus 3^{us} linearis, 2^{o} dimidio longior. *Antennæ* setosæ. *Abdomen* alas posticas sat superans; fasciculus apicalis parvus. *Pedes* validi, fimbriati; calcaria longissima. *Alæ* latæ; anticæ acutæ, subfalcatæ.

Male. Body very stout Proboscis of the usual length. Palpi smooth, erect, rising much higher than the vertex; 3rd joint linear, much more slender than the 2nd, and rather more than half its length. Antennæ setose. Abdomen extending rather beyond the hind wing; apical tuft small. Legs stout; femora and tibiæ fringed; spurs very long. Wings broad. Fore wings acute, subfalcate; exterior border convex, moderately oblique; 3rd inferior vein very near the 2nd, 4th very remote. Hind wings with an oblique interior border; interior angle prominent.

VARIA RUBIGINEA. *Mas.* Ferrugineo-rufa; alis anticis subglaucescentibus, lineis duabus obscurioribus obliquis undulatis, 2^{a} punctis albis ornata, linea exteriore e punctis fuscis cinereo marginatis; alis anticis macula orbiculari et reniformi maximis, orbiculari cinerea punctum fuscum includente, reniformi cinereo varia, linea antemedia fusca angulosa indistincta.

Male. Ferruginous red, cinereous beneath except the fringe of the wings. Fore tibiæ with white tips; tips of the tarsal joints white; spurs with white bands. Wings slightly glaucous-tinged, with two darker oblique undulating lines—one antemedial, the other postmedial (accompanied by white points); an exterior line of brown cinereous-bordered points. Fore wings with a cinereous mark between the 2nd and 3rd lines; orbicular and reniform marks very large; orbicular round, cinereous, with a brown point in the middle; reniform partly cinereous; an indistinct zigzag brown line near the base; underside with a blackish lunule in the disk. Length of the body 11 lines; of the wings 26 lines.

PHURYS TELIGERA. *Fœm.* Cervina; alis anticis vitta postica cinerea nigro conspersa strigaque fusca lata cinereo marginata; alis posticis fuscescenti-cinereis.

Female. Fawn-colour. Palpi smooth, slender, nearly erect, rising a little higher than the vertex; 3rd joint lanceolate, a little more than half the length of the 2nd. Hind tegulæ of the thorax very long. Abdomen not extending beyond the hind wings. Wings with a brown marginal festoon. Fore wings with a cinereous black-speckled stripe along the interior border and with a broad brown cinereous-bordered streak, which rests on the stripe and extends to the tip. Hind wings brownish cinereous. Length of the body 8 lines; of the wings 20 lines.

Gen. BATIA.

Mas. Corpus robustum læve. *Proboscis* mediocris. *Palpi* graciles, squamosi, arcuati, ascendentes, verticem non superantes; articulus 3^{us} lanceolatus, 2° valde brevior. *Antennæ* graciles, pubescentes. *Thorax* squamosus. *Abdomen* alas posticas non superans; fasciculus apicalis parvus. *Pedes* læves, sat graciles; calcaria longa, gracilia. *Alæ* latæ; anticæ acutæ, fasciculo subcostali munitæ, margine exteriore perparum obliquo.

Male. Body stout, smooth. Proboscis of the usual length. Palpi slender, squamous, curved, ascending, not rising higher than the vertex; 3rd joint lanceolate, much shorter than the 2nd. Antennæ slender, minutely pubescent. Thorax squamous. Abdomen not extending beyond the hind wings; apical tuft small. Legs smooth, rather slender; spurs long, slender. Wings broad. Fore wings acute; exterior border convex, very slightly oblique; a costal tuft beyond the middle above, and a subcostal tuft before the middle on the underside.

BATIA SQUAMICOSTA. *Mas.* Ferrugineo-rufa, abdomine alisque posticis nigricanti-cinereis; alis anticis nigricante subconspersis lineis duabus cinereis, 1^{a} recta, 2^{a} apud costam reflexa.

Male. Ferruginous red. Abdomen, hind wings, and underside blackish cinereous. Fore wings very minutely blackish-speckled; two cinereous lines; first line antemedial, straight; second postmedial, oblique, much reflexed near the costa and joining the tuft. Length of the body 6 lines; of the wings 17 lines.

THERMESIA BIPUSTULATA. *Fœm.* Ferrugineo-rufa; palpis erectis, verticem longe superantibus, articulo 3° lineari 2° breviore; alis lineis tribus nigricantibus undulatis indistinctis, 3ª punctis albis comitata; alis anticis plaga costali subapicali ochracea albo marginata macula orbiculari et reniformi parvis nigricantibus, linea 1ª punctis albis comitata.

Female. Ferruginous red, cinereous beneath. Palpi erect, slender, rising much higher than the vertex; third joint linear, rather shorter and more slender than the second. Abdomen not extending beyond the hind wings. Legs smooth, rather slender. Wings with three indistinct blackish undulating lines; third line postmedial, accompanied by white points. Fore wings acute, with a costal subapical ochraceous white-bordered patch; orbicular and reniform marks small, blackish, between the first and second lines; first line accompanied by white points; exterior border convex, moderately oblique. Length of the body 8 lines; of the wings 17 lines.

Gen. MANDELA.

Mas. *Corpus* sat robustum. *Proboscis* mediocris. *Palpi* sat graciles, oblique ascendentes, verticem paullo superantes; articulus 2ᵘˢ squamosus; 3ᵘˢ 2° brevior, obtusus, apicem versus subincrassatus. *Antennæ* setulosæ. *Abdomen* alas posticas perpaullo superans; fasciculus apicalis compressus, minimus. *Pedes* læves, graciles; calcaria longa, gracilia. *Alæ* elongatæ, margine exteriore subdentato; alæ anticæ vix falcatæ; alæ posticæ margine exteriore sat obliquo.

Male. Body moderately stout. Proboscis of the usual length. Palpi obliquely ascending, rather slender, much longer than the breadth of the head, rising a little higher than the vertex; second joint squamous: third rather shorter than the second, slightly increasing in breadth from the base to the tip, which is obtuse. Antennæ minutely setulose. Abdomen extending very little beyond the hind wings; apical tuft compressed, very small. Legs smooth, slender; spurs long, slender. Wings elongate; exterior border festooned. Fore wings very slightly falcate; exterior border slightly convex, moderately oblique; first, second and third inferior veins approximate at the base; 4th very remote. Hind wings with the exterior border receding much from the abdomen.

MANDELA CROCEA. *Mas.* Læte lutea; capite, palpis thoraceque antico cinereo-purpureis; abdomine fasciis quatuor purpurascenti-cinereis, ventre pedibusque albidis; alis anticis vitta costali purpurea nigricante conspersa, punctis duobus nigris, lineis tribus angulosis apud costam nigris et retractis punctoque basali læte rufis, fascia marginali rufa guttas canas includente.

Male. Bright luteous, paler beneath. Head, palpi and fore part of the thorax cinereous-purple. Abdomen with some bright-red speckles on each side of the base of the second segment, and with a purplish-cinereous band on the fore border of each of the last four segments; underside and legs whitish. Fore wings with a purple blackish-speckled costal stripe, and with a broad irregular red marginal band, which includes a line of hoary dots; a bright-red point at the base and three bright-red zigzag lines, which are retracted and black near the costa; a black point between the first line and the second, and another between the second line and the third; five white costal points near the tip; marginal lunules black; fringe blackish cinereous, white-bordered: underside red, with four irregular black lines and a postmedial black patch. Hind wings with an irregular antemedial red band which contains an irregular white blackish-bordered line; an exterior blackish line and three more exterior lines composed of red points, some of the points in the second line marked with blackish; marginal line red, with a blackish festoon; fringe paler than that of the fore wings: underside with three blackish denticulated lines, of which the third is interrupted. Length of the body 5 lines; of the wings 14 lines.

HYPENA MEGASPILA. *Fœm.* Obscure fusca; alis anticis cervinis, purpurascenti-cinereo tinctis, plaga trigona maxima obscure fusca albido marginata, linea exteriore fusca lineaque adhuc exteriore e lituris parvis fuscis.

Female. Dark brown, slender. Frontal tuft porrect, acute, very prominent. Abdomen and underside dark cinereous. Legs slender. Fore wings acute, fawn-colour, suffused with purplish cinereous; a very large dark-brown whitish-bordered triangular patch, which occupies the whole costa except at the base and at the tip, and extends nearly to the interior border; a brown line nearly parallel to the outer side of the patch, and an irregular more exterior line of small brown marks; exterior border slightly convex, rather oblique. Length of the body 5 lines; of the wings 14 lines.

LAMETIA RETUSA. *Fœm.* Ferrugineo-rufa; palpis oblique ascendentibus, verticem longe superantibus; abdomine subtus pallide luteo; alis anticis chalybeo suffusis, apice retusis, fascia marginali lata aurata; alis posticis luteis, fascia marginali lata nigricante.

Female. Ferruginous red. Frontal tuft prominent. Palpi obliquely ascending, rising much higher than the vertex. Abdomen extending rather beyond the hind wings, pale luteous beneath. Fore wings chalybeous-tinged with the exception of a broad dark gilded marginal band; fringe red; tips retuse. Hind wings bright luteous, with a broad blackish band which blends with the ferruginous hue along the exterior border. Length of the body 9½ lines; of the wings 22 lines.

Gen. CASPERIA.

Mas. *Corpus* robustum. *Proboscis* mediocris. *Palpi* supra thoracem reflexi; articulus 2^{us} fimbriatus; 3^{us} fasciculatus, 2° vix brevior. *Antennæ* setosæ. *Abdomen* alas posticas non superans; fasciculus apicalis compressus, minimus. *Pedes* antici usque ad tarsorum apices densissime fasciculati. *Alæ* anticæ amplæ, acutæ, fimbria costali brevi reflexa, margine exteriore vix obliquo; posticæ margine exteriore subangulato.

Male. Body stout. Proboscis moderately long. Palpi reflexed over the head and the thorax, and extending nearly to the hind border of the latter; second joint with a short thick fringe; third nearly as long as the second, clothed from the base to the tip with a long thick clavate tuft of hairs. Antennæ setose. Pectus clothed with long hairs. Abdomen not extending beyond the hind wings; apical tuft compressed, very small. Legs stout; spurs long. Fore legs clothed nearly to the tips of the tarsi with a very thick mass of hairs. Posterior femora and hind tibiæ fringed. Wings long, broad; intermediate veins distinct towards the exterior border. Fore wings acute; a short reflexed costal fringe along one-fourth of the length from the base; exterior border slightly rounded, hardly oblique. Hind wings with the exterior border slightly angular near the interior angle.

CASPERIA EREBIPENNIS. *Mas.* Obscure fusca, palpis pedibusque anticis cervino pilosis; alis fascia postmedia cervina indistincta lineam nigram dentatam includente, linea exteriore cervina pallidiore angulosa, lunulis marginalibus nigris ochraceo marginatis; alis anticis guttis duabus ochraceis, linea antemedia nigra dentata.

Male. Dark brown, cinereous brown beneath. Palpi and fore legs clothed with fawn-coloured hairs. Wings with an indistinct fawn-coloured postmedial band which includes a dentate black line; an exterior paler fawn-coloured zigzag line; marginal lunules black, bordered with ochraceous. Fore wings with a black dentate line at a little beyond one-third of the length from the base; an ochraceous subcostal dot nearer the base; another ochraceous dot in the areolet. Length of the body 12 lines; of the wings 34 lines.

CHÆRODES BOGOTARIA. *Mas.* Cinereo-ferruginea; alis fusco conspersis, fusco pallido subnebulosis, linea obliqua lineaque exteriore lata angulosa obscure fuscis; alis anticis falcatis, linea 1^a subarcuata, linea antemedia obscure fusca, strigula media argentea; alis posticis linea 1^a angulosa, margine angulato.

Male. Cinereous ferruginous, more cinereous beneath. Palpi obliquely ascending, not rising so high as the vertex; third joint lanceolate, not more than one-half of the length of the second. Antennæ slender. Abdomen shorter than the interior border of the hind wings. Wings minutely and transversely brown-speckled, slightly clouded with pale brown; a dark-brown line which is zigzag in the hind wings and slightly curved inwards in the fore wings, and extends from the middle of the interior border of the hind wings to near the tips of the fore wings, where it is acutely retracted to the costa; a broad exterior dark-brown zigzag line, which is abbreviated in the fore part of the fore wings: underside with an irregular brown marginal band. Fore wings very falcate; a dark-brown oblique line near the base; a little transverse undulating silvery streak at the end of the areolet. Hind wings with the exterior border angular in the middle. Length of the body 8 lines; of the wings 28 lines.

CLYSIA DISCOLOR. *Fœm.* Subochracea; alis fusco et nigricante strigatis, fasciis duabus indeterminatis flavescenti-cinereis maculis albidis comitatis, linea submarginali nigricante lata angulosa cinereo varia, margine exteriore angulato; alis anticis falcatis, plaga antemedia flavescenti-cinerea; alis posticis marginis exterioris angulo magis determinato.

Female. Dull ochraceous, cinereous beneath. Palpi obliquely ascending, not rising so high as the vertex. Abdomen much shorter than the interior border of the hind wings. Wings minutely and transversely streaked with brown and with blackish; two incomplete and irregular yellowish-cinereous bands, each of which is accompanied by a few whitish spots, one of the latter represents the reniform mark and contains a black point; submarginal line broad, blackish, zigzag, varied with cinereous, exterior border forming an angle: underside with an irregular whitish marginal band. Fore wings falcate, with a yellowish cinereous patch near the base. Hind wings with the angle of the exterior border much more prominent and acute than that of the fore wings, and with two more distinct anterior teeth. Length of the body 10 lines; of the wings 28 lines.

Gen. AZELINA.

Sectio nova.

Fœm. *Corpus* crassum. *Proboscis* robusta, sat longa. *Palpi* robusti, porrecti, caput perpaullo superantes; articulus 2^{us} brevissime fimbriatus, 3^{us} minimus. *Antennæ* graciles. *Abdomen* lineare, fasciculis quatuor parvis lateralibus. *Pedes* robusti; calcaria brevissima. *Alæ* amplæ, margine exteriore dentato.

Female. Body thick. Proboscis stout, moderately long. Palpi stout, porrect, extending very little beyond the head; second joint with a very short fringe; third extremely small. Antennæ slender. Abdomen linear, hardly as long as the interior border of the hind wings, with two small tufts on each side near the tip. Legs stout, smooth; spurs very short. Wings long, broad; exterior border irregularly dentate. Fore wings acute; exterior border slightly rounded, rather oblique.

AZELINA SATURATA. *Fœm.* Fusca; alis anticis striga alba angulata, linea antemedia nigricante angulosa apud costam atra et dilatata, lineis duabus postmediis nigricantibus subundulatis fere contiguis, 2^{a} antice atra postice diffusa, linea exteriore dentata strigaque adhuc exteriore lanceolata nigro marginata chalybeis, punctis quinque albis submarginalibus; alis posticis linea postmedia fusca albido marginata, guttis quatuor marginalibus atris.

Female. Brown, cinereous-brown beneath. Fore wings with a white angular streak on the disk; an antemedial blackish zigzag line, which forms an angle towards the streak, whence to the costa it is deep black and dilated and retracted; two blackish postmedial oblique slightly undulating nearly connected lines; second line deep black along the fore part, diffuse along the hind part, where it is bordered on the outer side by an acutely dentate chalybeous line, the latter is connected with a lanceolate darker chalybeous broadly black-bordered streak; two exterior incomplete brown lines; five white submarginal points; a black point behind the fifth white point; underside with small pale testaceous costal marks. Hind wings with a black point in the disk and with an exterior brown whitish-bordered line; four deep-black dots along the hind part of the exterior border, successively increasing in size towards the interior angle. Length of the body 8 lines; of the wings 24 lines.

Gen. NORSIA.

Mas. *Corpus* sat gracile. *Proboscis* mediocris. *Palpi* validi, verticem paullo superantes; articulus 2^{us} fimbriatus, oblique ascendens; 3^{us} lanceolatus, porrectus, 2^{i} dimidio brevior. *Antennæ* crenulatæ. *Abdomen* alas posticas longe superans; fasciculus apicalis parvus. *Pedes* validi; tibiæ fimbriatæ; calcaria sat longa. *Alæ* anticæ latæ, longissimæ, vix falcatæ, margine exteriore perobliquo, margine interiore undulato.

Male. Body rather slender. Proboscis of the usual length. Palpi stout, rising a little higher than the vertex; second joint obliquely ascending, with a short thick fringe in front; third lanceolate, porrect, about one-third of the length of the second, with which it forms an obtuse angle. Antennæ minutely crenulated. Abdomen extending much beyond the hind wings; apical tuft small. Legs stout; tibiæ with a long fringe; spurs moderately long. Wings broad, very long. Fore wings acute, hardly falcate; exterior border convex, very oblique; interior border undulating, dilated near the base, excavated beyond the middle; second inferior vein about thrice as far from the third as from the first.

NORSIA VINCTA. *Mas.* Pallide rufescens, alis anticis lineis pallide cinereis fusco marginatis, 2^a abbreviata, 3^a, 4^a, 6^a, 8^a et 9^a brevissimis, 5^a antemedia, 10^a submarginali, alis posticis cervinis fimbria pallide cinerea.

Male. Pale reddish, pale reddish-cinereous beneath. Fore wings with various oblique pale cinereous brown-bordered transverse lines. First line very near the base; second abbreviated; third and fourth very short, near the costa; fifth slightly antemedial; sixth very short; seventh more oblique than the others; eighth and ninth very short, near the interior angle; tenth near the exterior border. Hind wings fawn-colour; fringe pale cinereous. Length of the body 15 lines; of the wings 36 lines.

BOARMIA DEMISSARIA. *Mas.* Albida, palpis nigricantibus, tibiis posticis subincrassatis; alis fusco conspersis, lineis tribus e punctis nigricantibus, fascia atomosa fusca, puncto medio punctisque marginalibus nigris.

Male. Whitish. Palpi blackish, obliquely ascending, not rising higher than the vertex; third joint extremely small. Antennæ broadly pectinated. Abdomen not extending beyond the hind wings; apical tuft very small. Hind tibiæ slightly incrassated. Wings brown-speckled, with three oblique lines of blackish points; first line antemedial; second postmedial, accompanied by a very incomplete brown band, which is composed of clustering speckles; third submarginal; a blackish point in the disk between the first line and the second; marginal points black; underside with a dark-brown marginal band. Length of the body 7 lines; of the wings 22 lines.

ACIDALIA FULVICOSTA. *Fœm.* Argenteo-alba, capite antico fusco; antennis validis, pubescentibus; alis subhyalinis, cinereo conspersis; alis anticis puncto nigro, costa fulva.

Female. Silvery white. Head brown, excepting the vertex. Palpi brown. Antennæ stout, very minutely pubescent. Abdomen rather shorter than the interior border of the hind wings. Legs smooth, slender. Wings slightly hyaline, thinly and very minutely speckled with cinereous. Fore wings acute, with a black point in the disk; costa tawny. Length of the body 5 lines; of the wings 15 lines.

MICRONIA METARGYRIA. *Fœm.* Nivea, alis lineis duabus pallide fuscescenti-cinereis, alis anticis lineis quinque; alis posticis subcaudatis, linea 2^a dilatata argenteo marginata, plaga ochracea, maculis duabus atris.

Female. Pure white. Abdomen much shorter than the interior border of the hind wings. Wings with two pale brownish-cinereous lines; first line not oblique, extending from a little beyond one-fourth of the length of the costa of the fore wings, abbreviated at some distance from the exterior border of the hind wings; second at a little beyond three-fourths of the length in the fore wings, very near the border in the hind wings. Fore wings with three additional lines, the first near the base, the second at a little beyond the middle; the third marginal. Hind wings subcaudate; second line dilated, including a little silvery streak, bordered by a silvery line, interrupted by an ochraceous patch; this is connected with two deep-black spots, of which the largest is on the subcaudate angle. Length of the body 6 lines; of the wings 21 lines.

Gen. ISSA.

Mas. *Corpus* sat validum. *Proboscis* brevis. *Palpi* graciles, ad frontem applicati, verticem non attingentes; articulus 3^{us} minimus. *Antennæ* serratæ, setosæ. *Abdomen* alas posticas non superans; fasciculus apicalis parvus, subcompressus; fasciculi duo parvi, ventrales, subapicales. *Tibiæ* densissime fimbriatæ. *Alæ* latæ, margine exteriore vix dentatæ. *Alæ* anticæ vix acutæ, margine exteriore subobliquo. *Alæ* posticæ margine interiore obliquo.

Male. Body moderately stout. Proboscis short. Palpi slender, applied to the head, not rising so high as the vertex; third joint extremely small. Antennæ minutely serrated, densely setose. Abdomen rather shorter than the interior border of the hind wings; apical tuft small; slightly compressed; a tuft on each side beneath near the tip. Legs with very densely fringed tibiæ. Wings broad; exterior border very slightly festooned. Fore wings hardly acute; exterior border slightly oblique, very slightly rounded. Hind wings with the interior border receding much from the abdomen.

ISSA MUNDA. *Mas.* Pallide flavescenti-cinerea, capite palpisque fuscis; alis fusco pallido subconspersis, lineis duabus angulosis pallide cervinis, linea marginali fusca, punctis marginalibus nigris; alis anticis puncto nigro, alis posticis macula nigra.

Male. Pale yellowish cinereous. Head and palpi brown. Wings very minutely speckled with pale brown; two pale fawn-coloured zigzag lines; first line antemedial, with some brown points in the fore wings, indistinct in the hind wings; second postmedial; an exterior slightly undulating line of black points; marginal festoon brown, accompanied by black points; underside with a black lunule, with two exterior dentate black lines and with a black marginal festoon, the first line indistinct. Fore wings with a black point between the first and second lines. Hind wings with a black spot between the first line and the second. Length of the body 7 lines; of the wings 20 lines.

Gen. TORA.

Mas. *Corpus* gracile. *Proboscis* brevis. *Palpi* porrecti, graciles, brevissimi; articulus 3^{us} minimus. *Antennæ* subpubescentes, sat validæ. *Abdomen* breve; fasciculus apicalis minimus. *Pedes* breves, graciles. *Alæ* amplæ. *Alæ* anticæ acutæ, margine exteriore perobliquo. *Alæ* posticæ margine exteriore subtruncato, margine interiore obliquo.

Male. Body slender. Proboscis short. Palpi porrect, slender, very short; third joint very small. Antennæ rather stout, very minutely pubescent. Abdomen much shorter than the interior border of the hind wings; apical tuft very small. Legs smooth, slender. Wings broad, elongate. Fore wings acute; exterior border slightly convex, very oblique. Hind wings with the exterior border somewhat truncated; interior border receding much from the abdomen.

TORA UNILINEA. *Mas.* Ochracea; alis anticis apice fuscis, fascia postmedia alba obliqua; alis posticis subtus fuscis, albo trivittatis.

Male. Ochraceous. Fore wings brown about the tips, with a narrow white band, which extends from five-sixths of the length of the costa to the middle of the exterior border. Hind wings brown and adorned with three white stripes on the underside; first stripe costal, extending along the exterior border to the end of the second; second a little in front of the middle of the breadth; third abbreviated, very near the interior border. Length of the body 4½ lines; of the wings 16 lines.

Remarks on *Distoma clavatum* from a Sword-fish. By T. Spencer Cobbold, M.D., F.R.S., F.L.S., Lecturer on Comparative Anatomy at the Middlesex Hospital.

[Read Jan. 17, 1867.]

During my stay at Lynn, Norfolk, in August 1865, a fine example of the common Sword-fish (*Xiphias gladius*) was cast ashore in the estuary. Although quite dead when discovered, the creature was in a tolerably fresh condition; and when subsequently dissected by Dr. John Lowe and myself, some of its internal parasites were still alive. Respecting the structure of the fish I do not propose to offer any particulars; but it may be worth while remarking that it measured exactly ten feet and two inches from the tip of the snout to the end of the upper division of the tail. Several other careful measurements were taken, which, together with useful data regarding the natural history of the species, will, I believe, be placed on record by Dr. Lowe, who has for some years past devoted much attention to the zoology of the Norfolk estuary, and especially to the fishes.

Five different species of Entozoa were encountered in the flesh and intestinal canal of this Sword-fish—namely, *Distoma clavatum*, *Ascaris incurva*, *Bothriocephalus plicatus*, *Tetrarhynchus attenuatus*, and a form of Scolex referable to a second species of the last-named genus. On the first-named of these parasites I proceed to offer some observations—not, indeed, with the view of seeking to establish the existence of new species by splitting up an old one, but rather for the purpose of showing that the *Distoma clavatum* may be viewed as representing a variety of forms hitherto regarded as separate species by helminthological writers.

Distoma clavatum.—Five examples of a trematode, which I believe to be referable to this species, were found in the stomach. They severally varied in length from four lines to two inches. They were dead, and apparently only very slightly if at all decomposed. They differed somewhat in shape; but all had the so-called head and neck directed backwards. In one example the anterior slender moiety formed a right angle with the body proper, the margin of the ventral acetabulum, viewed from before, being, as it were, placed on a level with the oral sucker. Below the ventral sucker, the two largest specimens were distended with eggs and black pigmentary matter, all of them showing, internally, a dark spot near the centre of the neck. All of them likewise exhibited more or less well-marked transverse rugæ, extending from the root of the ventral sucker to the lower end of the body. The last ring thus formed surrounded a distinct caudal orifice, representing the outlet of a largely developed contractile vesicle. The eggs presented an average longitudinal diameter of $\frac{1}{800}''$. Some other points bearing upon the question of specific difference will be incidentally mentioned below.

When recently occupied in revising the collection of Entozoa contained in the Museum of the Royal College of Surgeons, I encountered a considerable variety of parasites without any labels attached, or any mark capable of guiding one as to the source of the specimens. Amongst these were several flukes, which, though differing from each other in respect of size and shape, appeared to be identical species. One of these specimens I afterwards found to be the actual *Distoma clavatum* described and figured by Professor Owen in the Zoological Society's Transactions. Several of the others I have since (by comparing them with specimens deposited in the British Museum) clearly made out to be part of a series contributed by Mr. George Bennett; but the College Museum-stores contained yet a third group of specimens, whose history has hitherto evaded all my endeavours to unravel it. The large individual described by Professor Owen was formerly in the collection of the Rev. Lansdowne Guilding; but we do not know from what fish it was obtained. In Dr. Baird's catalogue, the specimens presented by Mr. Bennett are stated to have come from the stomach of the Bonito; and it is not improbable that Mr. Guilding's specimens, as well as many others whose history is wanting, may be referred to the same "host." Be that as it may, however, the specimens in question not only differ very markedly among themselves, but also, in some respects, from many other forms referable to the same species. I here allude to the various specimens described by systematists, some under one title and some under another. In fact, a species-splitter can point to five or six tolerably distinct forms, which in my view ought to be regarded as specifically identical. To prove this, however, it is necessary to investigate the matter with some care, and to pass in review all the more important notices which have from time to time appeared.

In the year 1730, M. Garsin, a surgeon in the employ of the Dutch East-Indian Company, and Corresponding Member of the French Academy of Sciences, first described this worm, under the generic title of *Hirudinella*. He says:—"Cet insecte tiré de l'estomac de la Bonite ne vécut qu'environ deux heures. Exposé à l'air il étoit languissant, et reprenoit de la vivacité dans de l'eau de mer. Il diminua sensiblement de volume pendant qu'il vivoit encore"*. M. Garsin's brief description is accompanied by three figures, two of them giving a plan of the possible movements of the head and neck, on the one hand, and of the body on the other, the ventral sucker being the fixed point. His specimens do not appear to have exceeded one inch and a half in length.

In 1774, Pallas described a trematode under the generic and specific names of *Fasciola ventricosa*. It measured two inches in length; but we are left in doubt as to whether it was obtained from any fish. All that he says regarding its source is as follows:—"Ex Amboyna missum fuit singulare hoc molluscum, quod ad aliud quam Fasciolarum genus referre non potui, in quo quasi gigas erit"†. He remarks upon its pale white colour, and notices particularly the soft elastic body proper, which when wounded gave out a dark matter resembling soot. This material, when examined with the microscope, appeared perfectly fresh, and was not the result of decomposition. Pallas also gives many other details respecting the structure of the parasite, accompanied by a figure.

In 1790, Menzies likewise described and figured a fluke about two inches long, which, though differing remarkably from the foregoing in respect of shape, is nevertheless identical. His account of the parasite is recorded in the first volume of the Linnean Society's Transactions, and he calls it *Fasciola clavata*:—"It is of whitish colour, somewhat pellucid, discharging at its mouth a black-coloured fluid which can easily be perceived through its body. I have often found it," he adds, "in the maws of the Boneto, between the tropics in the Pacific Ocean"‡. Notwithstanding the similarity of description, Menzies does not appear to have recognized the identity of his worm with that described by Pallas. Professor Owen, however, subsequently established this identity, and referred to the species as *Fasciola clavata* seu *ventricosa* §. On the other hand, the British-Museum Catalogue represents Pallas's worm as specifically distinct from that of Menzies, but as identical with the specimen described by Professor Owen from Mr. Guilding's collection.

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* Histoire de l'Acad. des Sciences à Paris, 1730, p. 44.

† Spicilegia Zoologica, Fascic. x. (1774) p. 18.

‡ Trans. Linn. Soc. vol. i. (1790) pp. 187, 188.

§ Trans. Zool. Soc. vol. i. (1835) p. 382.

In 1802, Bosc described and figured a trematode under the title of *Fasciola fusca*. This he obtained from the intestines of a Dorado. In form it differs considerably from any of the foregoing species, with all of which, however, it is probably identical. Bosc's description runs as follows:—"Brune, la partie postérieure très-renflée, presque ovale; la partie antérieure mince, cylindrique, inégale, avec deux petits tentacules en dessous. Le suçoir de l'anus très-grand"*. Bosc recognized the identity of his worm with the *Distoma Coryphenæ* of Rudolphi; and systematists generally have adopted his synonymy. In the British-Museum Catalogue the *Fasciola fusca* and *F. ventricosa* of Pallas are regarded as one and the same species. If two small appendages did really exist below the oral sucker, then Bosc's worm is certainly a distinct species. I have never seen anything resembling this amongst the trematode parasites—though the exserted penis might very well be mistaken for one such process. Helminthologists, generally, appear to have doubted the existence of such developments.

In 1827, Nardo obtained two very large flukes from the stomach of a fish captured in the Gulf of Venice during the month of September. He calls the fish *Prostostegus prototypus*, which appears to be the same as the *Luvarus imperialis* of Rafinesque. One of the parasites being no less than five inches in length and nearly half an inch in breadth, he appropriately named the species *Distoma gigas*, believing, naturally enough, that he had to deal with a new species. His description is as follows:—"Distoma teres, rubrum, retractile; poro ventrali minimo cujus apertura magna, rotunda, ciliata; poro antico terminali, parvo; collo brevi, retrorsum divergente, extensili, apice angusto, basi lato; cauda longa, postice incrassata et in apice obtuso osculo donata" †. Here, again, a character is introduced the nature of which it is extremely difficult to understand. I allude to the alleged ciliated condition of the ventral sucker, an appearance perhaps due to a wrinkled state of the lip. Apart from this I see no reason for supposing this parasite to be distinct from the *Distoma clavatum* procured by Mr. Guilding, or the *Fasciola ventricosa* described by Pallas. The intestines of the fish in question harboured another trematode parasite, to which Nardo applied the title *D. Raynerianum*. This appears to be a distinct species; but its size is not stated. Unfortunately, Nardo gives no figure of his *Distoma gigas*. It is by far the largest fluke at present known.

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* Hist. Nat. des Vers, vol. i. (1802) p. 271.

† Isis, for 1833, p. 523; from Heisinger's 'Zeitschrift,' 1827, p. 68.

In the year 1835, Professor Owen communicated to the Zoological Society the anatomical memoir to which I have already made reference. In his paper he ably discusses several questions relating to the structure of *Distoma clavatum*, and throws considerable light upon the organization of this species. He quotes the previous writings of Pallas, Rudolphi, and Menzies, and establishes the identity of *Fasciola ventricosa* and *F. clavata*. Although some particulars are wanting respecting the precise mode of termination of the digestive tubes, I think that there can be no doubt as to the propriety of retaining this species amongst the true Distomes. I believe that the large "lateral cavities" described by Professor Owen are neither more nor less than the somewhat unusually distended alimentary cæca. In this particular every helminthologist is familiar with the varieties presented by different species of Trematoda. At all events, there is here no good ground for retaining the generic name *Fasciola*; and still less are we called upon to recognize any of the forms under the title of *Hirudinella*, although Garsin first described the species under this generic title.

In 1845, Dujardin placed the worm with the true Distomes, yet at the same time expressed grave doubts as to whether it were, in any sense, a fluke. "Ce ver," he remarks, "n'est certainement pas un distome ni même un trématode. Si sa forme extérieure et ses deux oscules lui donnent quelque ressemblance avec les distomes, sa structure musculeuse le rapproche davantage des Gordius, et son tégument ressemble à celui des siponcles." M. Dujardin carefully examined the specimens preserved in the Paris Museum; and with regard to one particular example, described as "Fasciola, trouvé dans la mer de Nice," he says, it presents "une certaine analogie avec le prétendu *Distoma clavatum*." Manifestly Dujardin himself was somewhat puzzled by the resemblances in question. He does not appear to have had any opportunity of examining fresh specimens; yet he mentions the species as tolerably common in the Bonito, being also occasionally present in the Tunny. At all events it would appear by evidence derived from various sources, that the rightly so-called *Distoma clavatum* is not unfrequently taken from the ocean quite independent of its piscine "bearers."

In reviewing the foregoing notices it is of course open to any naturalist to doubt if they can, one and all, be said to refer to the same species of parasite; yet, notwithstanding divergencies of statements, if any one will take the trouble to examine all the specimens preserved in this country, I think he will arrive at the conviction which I have expressed at the outset of this paper. It is a comparatively easy task to name afresh every entozoon which happens to come into one's possession; but to ascertain how often it has previously been described may involve a good deal of labour. As an illustration of the truth of the latter remark, I subjoin a list of the synonyms which I believe to belong to the species under consideration:—*Distoma clavatum*, Rudolphi=*D. Coryphænæ*, Rud.=*D. gigas*, Nardo=*Fasciola clavata*, Menzies =*F. Coryphænæ*, Bosc=*F. Coryph. Hippuridis* and *F. Scombri Pelamidis*, Tilesius=*F. fusca*, Bosc=*Hirudinella marina*, Garsin =*H. clavata*, Baird.

Probably we may here also include Rudolphi's *Distoma tornatum*; but I have never seen the caudal extremity of *D. clavatum* projected to the extent described by Dujardin as occurring in *D. tornatum*, though I think it quite capable of becoming so. Diesing, in my view, gives this accidental invaginating process too much prominence as a specific character when he writes, in regard to *D. tornatum*, " Cauda longissima, gracilescente, moniliformi," overlooking the circumstance that the tail is normally truncated posteriorly. Whether the correctness of my opinions respecting the synonymy of *D. clavatum* be admitted or not, I am confident, as regards certain other reputedly distinct forms of this genus and its allies, that they have had a common origin. On this score I may adduce evidence on some future occasion.

Experiments with *Trichina spiralis*. By T. Spencer Cobbold, M.D., F.R.S., F.L.S., Lecturer on Comparative Anatomy at the Middlesex Hospital.

[Read January 17, 1867.]

The present record may be regarded as a sequel to my paper on 'Experiments with the Cestoid Entozoa' recently submitted to the Society. In conducting these investigations, I have received the friendly cooperation of Professor Simonds, and of Assistant Professor Pritchard, of the Royal Veterinary College.

Exps. 1 and 2. On the 15th March, 1865, an ounce of flesh containing Trichinæ was administered to a small black bitch. The dog was destroyed five days subsequently; but neither intestinal nor muscle-trichinæ were discovered. It was thought that the dog had thrown up the bolus, which was strongly saturated with chloride-of-zinc solution. The bolus consisted of a portion of the *pectoralis major* of a subject brought to the dissecting-room at the Middlesex Hospital. The cysts were highly calcified; but the majority contained living embryos, which were quite unaffected by the zinc-solution injected into the body to prevent decomposition. At the same date a small white puppy was experimented on and examined with precisely the same results. In either case it was, of course, too early to expect muscle-fleshworms to have become developed.

Exp. 3. Half an ounce of the same trichinous human flesh was given (at the same date) to a black-and-tan puppy reared at the Royal Veterinary College, a second "feeding" being administered on the 21st of March, or six days after the first. In this case Mr. Pritchard, who fed the animal, took the precaution to chop the muscle into small pieces and to mix it with other food, in order that the flesh might be the more readily retained in the stomach. The puppy was not destroyed until the 15th of the following June, when, on examination, numerous encysted but non-calcified muscle-trichinæ were found in all the voluntary muscles subjected to microscopic scrutiny.

Exp. 4. An ounce of the same flesh was given to a dark-coloured pig on the 15th of March, and again on the 20th, several other "feedings" being also administered during the month of April (1865). It was destroyed on the 16th of May; but no Trichinæ were detected.

Exp. 5. An ounce of the same human muscle-flesh, administered to a small sheep (which was subsequently killed on the 29th of June), produced the same negative results.

Exps. 6 and 7. "Feedings" were at the same time administered to a rat and a mouse. The mouse died on the 2nd April, when I examined its muscles without success. On the following day the rat made its escape, but whether trichinized or not I cannot say.

Exp. 8. An ounce of trichinous human flesh was given to a donkey, in the form of "balls," on the 20th of March; and during the month of June four other separate "feedings" with trichinous dogs' flesh were also administered. In this case the animal was parted with without the result being ascertained.

Exp. 9. From the 15th to the 20th March, 1865, inclusive, three small Trichina "feedings" were likewise administered to a guinea-pig. This little animal was not destroyed until the 15th of the following June, when a positive result was obtained. The *pectoralis transversus* and other muscles were found to harbour a considerable number of encysted Trichinæ.

Exp. 10. On the 20th March, and again on the 21st (1865), "feedings" from the same human subject were administered to a hedgehog. On the 26th of April the animal seemed to be attacked with symptoms of trichinosis. It refused food, kept its head extended and the eyelids closed. On the 27th it appeared much worse, and on the morning of the 28th it was found dead. On the 29th I examined the flesh and found abundance of living Trichinæ in the muscles. The capsules were very thin and transparent. A few days later Mr. Simonds also examined the flesh, and confirmed this result.

Exps. 11 and 12. Two chickens were fed, on the 21st of March, with the same material. One of the birds died on the 24th, when I examined the intestines and detected one or two very minute nematodes, which, at the time, I believed to be imperfectly developed Trichinæ, but subsequently saw reason to alter my opinion. The other bird died on the 3rd of April, and certainly contained no muscle-trichinæ.

Exp. 13. On the 22nd and 23rd of March "feedings" amounting to an ounce of flesh in all were given to a mole. This animal was returned to the care of Mr. Charles Land, who had previously sent it to the Veterinary College. He subsequently reported that, after observing the mole to be "working" for two or three days, he lost all trace of it, and concluded that it had either escaped or was dead.

Exp. 14. On the 1st and 2nd of May portions of the left fore extremity of the hedgehog (in which we had successfully reared *Trichina* from the Middlesex-Hospital subject) were offered by Mr. Simonds to a cat. The "tabby" ate the flesh very readily, consuming the entire limb. On the 15th of the following June the cat was killed, when living Trichinæ were found within all the muscles which we examined.

Exp. 15. At the same dates a young terrier dog was similarly treated, but did not take the "feeding" so readily. In this case the left hind extremity of the hedgehog was employed, and what was not eaten voluntarily was forcibly introduced. On the 1st of June the dog was attacked with "distemper," and died on the 8th of the same month. On examination we found several living Trichinæ in the *sterno-maxillaris* and other muscles. Some of the parasites were encysted.

Exp. 16. From the 9th to the 12th of June, inclusive, four separate worm feedings with the flesh of the trichinized terrier-dog were administered to a crow. The bird was killed some months afterwards and sent to me for examination. Its muscles were entirely free from Trichinæ.

Exp. 17. From the 9th to the 17th of June, inclusive, seven separate worm feedings were administered to a pig. One of the "feedings" was with the trichinized guinea-pig's flesh, the others from the dog. This animal was not destroyed until the 4th of April, 1866, when all the muscles which I examined were found extensively infested with Trichinæ. There were probably not less than 16,000,000 present, all being alive and enclosed within perfectly-formed capsules, none of which latter exhibited any traces of calcareous deposition.

Exp. 18. Four separate "feedings" with trichinous dogs'-flesh were likewise, at the same dates as the foregoing, administered to a rat. This experimental animal, however, like the one previously mentioned, contrived to make its escape. I fear it was well trichinized.

Exp. 19. About the same date trichinous "feedings" were given to a black puppy (bred at the Veterinary College). The dog was killed on the 18th of August, 1866, having also been made the subject of an echinococcus feeding, when I found abundance of encysted Trichinæ within the voluntary muscles.

Exp. 20. Four separate worm feedings with the flesh of the trichinized guinea-pig were given to a sheep on the 15th, 16th, 17th, and 19th days of June, 1865. The experimental animal was destroyed on the 29th of the same month; but the result was negative.

Exps. 21 and 22. "Feedings" with the guinea-pig's flesh—four in the one case and three in the other—were also administered by Mr. Simonds (from the 15th to the 19th of June, inclusive) to a chicken and a goose respectively. These birds were destroyed some months afterwards and sent to me for examination; but the most careful scrutiny failed to detect any Trichinæ within their muscles. The goose was cooked and eaten without the slightest hesitation. The chicken I found too tough for consumption.

Exp. 23. On the 28th of March of the present year, I obtained a small quantity of muscle from a highly trichinized German subject, who died, from the effects of an accident, at the London Hospital the day previous. The case is fully reported by Dr. Thudichum in a new journal called 'Scientific Opinion' (No. 4, April 25, 1866, p. 55). During the same day (at 2.30 P.M.) I fed a dog with part of this human flesh. On the morning of the 31st I killed the dog and examined the intestinal canal (at 11.30 A.M.), which revealed the presence of sexually mature living Trichinæ. The males (of one of which I retain an accurate figure) displayed the characteristic bilobed caudal appendages, leaving no doubt as to their source and nature. I have mentioned the precise time of the experiment, in order to show that a period of sixty-nine hours proved amply sufficient for the develop mentof the young muscle-fleshworms of the human subject into the sexually mature adult Trichinæ of the dog.

Exp. 24. With another portion of this human flesh (taken from the muscles of the tongue) in which the Trichinæ were extraordinarily abundant, I fed a cat. In about ten days the animal showed the most marked symptoms of Trichinosis. It refused to eat; the eye lost its lustre; the body became very thin, and I thought the animal would die. By very great care, keeping it warm before the fire, and subsequently inducing it to take a little milk, the creature improved, gained flesh, and eventually recovered. About three months afterwards I destroyed this cat, when, on examining the *panniculus carnosus*, *latissimus dorsi*, and other superficial muscles, I found great quantities of well-developed, capsuled Trichinæ. Although the animal had swallowed scarcely a quarter of an ounce weight of infested flesh, yet thousands of parasites had been propagated in its flesh, and a nearly fatal helminthiasis set up. Dr. Thudichum, who saw the trichinized German subject, estimated the number of parasites in his body at 40,000,000. I do not think this estimate likely to be exaggerated; for if all the flesh had been infested to the extent I found to obtain in respect of the muscles of the tongue, I believe 100,000,000 would have been tolerably near the mark. In places, the point of a needle could not be thrust between the capsules, so closely were they agglomerated.

Exp. 25. From the 19th to the 25th of April, 1866, inclusive, daily admistrations of trichinous pork, in the form of bolus, were given to a sheep by Mr. Pritchard. The Trichinæ were from one of our experimental animals at the Veterinary College, about two ounces of the flesh being taken at each feeding. The flesh of the sheep (destroyed in the following November) failed to give any indication of the presence of the offspring of these parasites.

Exps. 26 and 27. About the same time, and occasionally at intervals extending over a period of five weeks, Mr. Pritchard also fed two young fowls with the same trichinous pork. Towards the close of October, 1866, both birds died, when Mr. Pritchard carefully examined the flesh of them, but failed to find any trace of Trichinæ.

Exps. 28 and 29. From April 2nd to the 9th of the same month, 1866, inclusive, feedings with trichinous pork were likewise given to two more dogs. These animals were destroyed and examined by Mr. Pritchard in November, 1866; but the result appeared to be negative.

Remarks.—Although, at first sight, these experiments do not, on the whole, appear to have been so successful as one might desire, yet the results obtained correspond very closely with those obtained by investigators on the continent. Thus the seven experiments on birds (including 5 fowls, 1 goose, and 1 crow) were all negative. This experience, so far as muscle-trichinæ are concerned, accords precisely with the results obtained by Profs. H. A. Pagenstecher and C. J. Fuchs at the Zoological Institute in Heidelberg. These experimenters, it is true, found that the ingested muscle-trichinæ acquired sexual maturity within the intestinal canal of their avian "hosts;" but they never found young Trichinæ in the muscles of the birds, nor did they perceive any evidences of an attempt on the part of the escaped embryos to effect a wandering or active migration on their own account. Clearly, if the bird's intestinal canal were a proper territory for the residence of sexually mature Trichinæ, Drs. Pagenstecher and Fuchs would have found abundance of wandering and non-encapsuled fleshworms, and we should have obtained (owing to the greater length of time which we generally allowed to elapse before destroying the experimental animals) sexually immature muscle-trichinæ enclosed in well formed capsules with, in some instances, more or less calcareous degeneration. I have put the matter thus clearly, because not a few persons still entertain the notion that Trichinæ are liable to infest all kinds of warm-blooded, and even, also, many kinds of cold-blooded animals, such as reptiles and fishes. Certain nematodes found in earthworms have been described as Trichinæ; and, consequently, pigs and hedgehogs were said to become trichinous through eating these annelids. The minute fleshworms described by Bowman from the muscle of the eel are not true Trichinæ, any more than the somewhat similar parasites (*Myoryktes Weismanni*) which Eberth found to infest the muscles of the frog. The negative results above obtained may therefore fairly be taken as positive, in one sense, inasmuch as they help us, with the aid of other experiences, to define the area of distribution legitimately assignable to *Trichina spiralis* as a good nematode species. Taken in connexion with what we know touching the limitations of distribution or occupation affecting other species of parasites, the facts have a special and very peculiar significance, one, however, upon which I cannot now enlarge. Deducting, therefore, from the 29 experiments the 7 instances, among birds, where the fleshworms would not develop themselves, and also the three separate cases where the experimental animals escaped, together with one other case where no opportunity of examination was afforded, we have left exactly eighteen mammals in which the results were, in all but two, very carefully ascertained. The exceptions were those of the first two dogs experimented on some two years back. The intestinal canal, or rather its mucous contents, were not sufficiently examined to enable me to affirm positively as to the absence of sexually mature Trichinæ. In a more recent instance (Exp. No. 23) I had evidence of the difficulty of finding the mature Trichinæ in the mucous and half-digested intestinal contents, although the experiment eventually proved perfectly successful. Of course the difficulty of testing the result is a thousandfold increased where only a very small number of Trichinæ have been administered. In the sixteen remaining cases the results appeared to have been fully ascertained; and out of these, nine were perfectly successful. The "negatives" comprised three sheep, two dogs, one pig, and a mouse. The "positives" embraced four dogs, two cats, one pig, one guinea-pig, and a hedgehog. At all events, at least one-half of the experiments on mammals yielded positive results, which, considering all the circumstances of the case, is by no means unsatisfactory. Carnivorous mammals, and especially those which subsist on a mixed diet, appear to be most liable to entertain Trichinæ; nevertheless it is quite possible to rear fleshworms in herbivora. Pagenstecher and Fuchs succeeded in rearing muscle-trichinæ in a calf; and they found three female intestinal trichinæ in a goat, but, apparently no muscle-fleshworms, although twenty-seven days had elapsed since the first feeding with trichinized rabbit's flesh. In our three sheep no trace of Trichinæ could be found. However, on account of the expense, comparatively few experiments have been made on herbivora; and therefore, perhaps, it is as well not to speak too positively from the data already afforded. Not that there is really any practical need for further experiments with this species of parasite; it is quite clear that, in their natural state, herbivorous mammals can seldom have an opportunity of infesting themselves, whilst the reverse is the case with swine, carnivorous mammals, and ourselves. Because many quadrupeds may become trichinous, it does not follow that all are liable to be infested. In the case of other parasites (the common fluke, for example) we find them limited to a larger or smaller number of hosts; whilst, on the other hand, in not a few cases, the territory occupied is that of the body of a single species. On this subject I must not now dwell; but I may instance as examples of very limited distribution the two most common cestodes liable to infest the human body. Nematodes, again, display analogous peculiarities of distribution, *Oxyuris vermicularis* being, so far as is at present known, only liable to infest man. Looking at the subject in relation to the public health, I have no hesitation in saying that a great deal of unnecessary fear has been created in this country. No doubt the Imperial authority in Russia has had good grounds for recently issuing an order prohibiting the importation of pork into that country, since severe endemics of Trichiniasis have occurred in neighbouring German states. In this country, however, ordinary precautions will suffice. English swine are almost entirely, if not absolutely, free from this so-called disease; and not a single case of Trichiniasis in the living human subject has been diagnosed in the United Kingdom. Some twenty or thirty cases have been discovered *post mortem*; and it is highly probable that most, if not all, of these individuals had contracted the disease, during life, by eating German pork sausages or other preparations of foreign meat. If further discussion of this aspect of the question were in accordance with the more special aims of the Linnean Society, I would willingly enlarge upon this department of the subject. The mere statement, therefore, of the general practical conclusion at which I have arrived will at least be considered sufficient for the present, and, at the same time, not altogether unsatisfactory.

A Monograph of the Genus *Lemonias*, with Descriptions of New Species in the Collection of the British Museum, including other forms sometimes placed in that Genus. By Arthur G. Butler, F.Z.S., Assistant in the Zoological Department, British Museum. Communicated by Dr. J. E. Gray, F.R.S., V.P.Z.S.

(With two Plates.)

[Read Nov. 15, 1866.]

My primary object in the present paper is to separate the typical or true species of *Lemonias* from those, of a different form and pattern, which, though allied to that genus, are too distinct both in form and pattern to be retained in it.

The little genus *Tharops*, for instance, can be so readily distinguished, both by form and coloration, from *Lemonias*, that it seems a violation of all order to include them under the same heading; the genus *Anatole*, again, in no way resembles *Lemonias* in coloration, and moreover differs from it entirely in outline.

I have carefully compared the pattern and structure of the different sexes in this group, and by the help of analogy, locality, &c. have been enabled to discover the opposite sexes of several species, of which the males or females alone have hitherto been recognized. I find, moreover, that in several instances two distinct males have been regarded as sexes of one species, whilst at other times two females have shared the same fate.

Genus Lemonias.

Lemonias *et* Calospila, *E. Doubleday.*
Lemonias (part.), *Westwood & Hewitson.*

Alæ anticæ maris supra cæruleæ, rufo fuscoque variæ; posticæ fuscæ, margine flavo: feminæ fuscæ, anticæ fascia obliqua alba. Anticæ subtus punctis nigro-fuscis iridatis scriptæ.

1. Lemonias Sudias. (Lemonias Sudias, *Hewitson, Exot. Butterf.* ii. p. 115, pl. 58. f. 12, 13, 14 (1858).)

Hab. Honduras. ♂, ♀. B.M.

Alæ maris fuscæ, cæruleo et aliquando albo variæ; feminæ fuscæ, sæpe albo variæ.

2. Lemonias Alector. (Hamanumida Alector, *Hübner, Zuträge Exot. Schmett.* f. 927, 928 (1806–27). Lemonias Alector, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 6 (1851).)

Hab. Brazil.

♀?. Alæ supra fuscæ: anticæ fascia subobliqua postmedia alba de costa, coarctata; maculis sex basalibus nigris, albo cinctis; maculis sex submarginalibus iride pallida cinctis: posticæ maculis quinque basalibus, sex septemve mediis in serie arcuata dispositis, septemque marginalibus nigris albo cinctis: corpus fuscum. Alæ subtus pallidiores, aliter velut supra: corpus albidum. Exp. alar. unc. $1\frac{3}{8}$. Pl. VI. fig. 1.

Hab. Tapajos. B.M.

3. Lemonias violacea, sp. nov. Pl. VI. figs. 2, 3.

♂. Alæ anticæ violaceæ, basi fuscescente; maculis tribus discoideis duabusque internis nigris violaceo cinctis; maculis sex dissimilibus mediis nigris in serie arcuata positis; area externa marginali nigro-fusca, a venis violaceis maculisque sex marginalibus nigris violaceo cinctis interrupta: posticæ albæ, costa violacea maculisque nonnullis basalibus nigris albido cinctis; punctis sex submarginalibus nigris: corpus fuscum. Anticæ subtus velut supra, fuscæ autem pallidioresque: posticæ costa fusca, punctis sex mediis in serie arcuata positis; aliter velut supra: corpus albido-fuscum. Exp. alar. unc. $1\frac{5}{16}$.

♀. Alæ supra fuscæ, anticæ fascia media alba; macularum exemplar velut in *L. Alectore*? ♀, maculis autem mediis magis ad basim approximantibus. Exp. alar. unc. $1\frac{5}{16}$.

Hab. Ega. ♂, ♀. B.M.

4. Lemonias Hübneri, sp. nov. (Calospila Aristus, *E. Doubleday, List Lep. Brit. Mus.* pt. ii. p. 15 (1847). Lemonias Aristus, *Hewitson, Gen. Diurn. Lepid.* pl. 71. f. 12 (1851). Lemonias leucocyana, *Westwood, ibid.* p. 458. n. 14 (1851).)

♂. Alæ anticæ fuscæ, venis apud marginem posticum, lineis duabus submarginalibus, duabusque discalibus apud costam intus angulatis, quarum interna valde irregularis est, violaceis; maculis tribus discoideis duabusque internis violaceo cinctis: posticæ velut eæ speciei præcedentis. Alæ anticæ subtus fuscæ, maculis basalibus velut supra nigris albo cinctis; sex septemve mediis similibus in serie obliqua apud costam intus angulata, et sex marginalibus majoribus: posticæ albæ, costa paulo fuscescente, maculis octo basalibus, sex mediis in serie valde irregulari dispositis septemque marginalibus nigris: corpus albidum. Exp. alar. unc. $1\frac{5}{16}$.

♀. Alæ anticæ fuscæ, maculis nigrofuscis velut in mari subtus dispositis: posticæ fuscæ, margine anali albo; maculis nigris, velut in mari subtus dispositis: corpus fuscum. Alæ subtus pallidiores, maculis nigris albo cinctis: aliter velut supra: corpus ochreo-fuscum. Exp. alar. unc. $1\frac{5}{16}$. Pl. VI. figs. 4, 5.

Hab. Para. ♂, ♀. B.M.

5. Lemonias leucocyana. (Echenais leucocyana, *Hübner, Zuträge Exot. Schmett.* f. 915, 916 (1806–27).) Pl. VI. figs. 6, 7.

Hab. Para. ♂. B.M.

6. LEMONIAS ARISTUS. (♀. Papilio Aristus, *Stoll, Pap. Exot.* pl. 39. f. 4, 4 c (1791). Erycina Aristus, *Godart, Enc. Méth.* ix. p. 580. n. 79 (1819). Lemonias Aristus, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 14 (1851). Peplia Ariste, *Hübner, Verz. bek. Schmett.* p. 20. n. 142 (1816). ♂. Lemonias Aminias, *Hewitson, Exot. Butterf.* iii. p. 117, pl. 54. f. 29 (1863).)

Hab. Surinam (*Stoll*), Guiana, Brazil (*Westw.*), Ega. ♂. B.M.

? *Var.* ♀. Lemonias Balista, ♂ *Hewitson, ibid.* iii. p. 116, pl. 58. f. 21, 22 (1863).

Hab. Amazon.

The arrangement of the spots in *Aminias* and *Balista* is the same as in *Aristus*.

Alæ anticæ feminæ supra fuscæ, albido fulvoque variæ; posticæ dimidio basali fuscæ albido scriptæ, apicali fulvæ. Alæ subtus pallidiores.

7. LEMONIAS ÆMULIUS. (♀ Hesperia Æmulius, *Fabricius, Ent. Syst.* iii. pt. 1. p. 322. n. 19 (1793); *Donovan, Ins. India*, pl. 44. f. 2 (1800); *Godart, Enc. Méth.* ix. p. 580. n. 75 (1819). Lemonias Æmulius, *Westwood, Gen. Diurn. Lepid.* p. 459. n. 22 (1851). Calospila? Geris, *E. Doubleday, List Lep. Brit. Mus.* pt. ii. p. 15 (1847). Desmozona hemixanthe, *Felder, Nov. Voy.* (1867).)

Hab. Brazil. ♀. B.M.

This species exactly agrees, in the form of its wings, with *Nymphidium Abaris*, Cramer.

8. LEMONIAS BOLENA, sp. nov. Pl. VI. fig. 8.

♀. Alæ supra ochreæ: anticæ costa basali fusca; area apicali quadrate fusca: posticæ stria interna anali marginali nigro-fusca; apice fusco. Alæ subtus velut supra pallidiores: corpus thorace fuscescente, abdomine ochreo. Exp. alar. unc. $\frac{13}{16}$.

Hab. Brazil. B.M.

Anticæ maris basisque posticarum ferrugineæ, area apicali posticarum nivea; alæ subtus fusco pro ferrugineo, anticæ macula anali alteraque minore marginali albidis: anticæ feminæ fuscæ, apice nigro-fusco, fascia lata media fulva; posticæ fuscæ, maculis marginalibus nigris albido cinctis; alæ subtus albidis, anticæ apice maculisque analibus, posticæ marginalibus nigro-fuscis.

9. LEMONIAS PENTHEUS. (♂. Papilio Pentheus, *Cramer, Pap. Exot.* ii. pl. 143. f. E. (1779); *Fabricius, Mant. Ins.* ii. p. 82. n. 734 (1787); *Fabr. Ent. Syst.* iii. pt. 1. p. 314. no. 186 (1793). Erycina Pentheus, *Godart, Enc. Méth.* ix. p. 580. n. 78 (1819). Calospila Pentheus, *E. Doubleday, List Lep. Brit. Mus.* pt. ii. p. 15 (1847). Lemonias Pentheus, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 18 (1851). Anatole Penthea, *Hübner, Verz. bek. Schmett.* p. 24. n. 188 (1816). ♀. Lemonias Anseris, *Hewitson, Exot. Butterf.* iii. p. 115, pl. 58. f. 21 (1863).)

Hab. Guiana, Brazil (*Westw.*), Tapajos, Para. ♂, ♀. B.M.

Alæ feminæ ferrugineæ albo variæ.

10. LEMONIAS SENTA. (♂. Lemonias Senta, *Hewitson, Exot. Butterf.* i. p. 115, pl. 58. f. 4, 5 (1853).)
Hab. Ega. ♀. B.M.

Alæ maris supra ferrugineæ fusco variæ, subtus albidæ punctis nigro-fuscis: feminæ supra fulvæ fusco variæ, aut flavæ, apice anticarum fusco, punctis interrupto; subtus albidæ, anticæ ochreo tinctæ, punctis nigro-fuscis.

11. LEMONIAS CILISSA. (Lemonias Cilissa, *Hewitson, Exot. Butterf.* iii. p. 117, pl. 59. f. 33 ♀, 34 ♂ (1863).)
Hab. Nicaragua. ♂, ♀. B.M.

12. LEMONIAS CRISPUS. (♂. Papilio Crispus, *Cramer, Pap. Exot.* ii. pl. 118. f. D, E (1779). Echenais Crispus, *Hübner, Verz. bek. Schmett.* p. 19. no. 123 (1816). Lemonias Crispus, *E. Doubleday, List Lep. Brit. Mus.* ii. p. 16 (1847); *Westwood, Gen. Diurn. Lepid.* p. 459. no. 26 (1851). ♀. Papilio Emylius, *Cramer, Pap. Exot.* i. pl. 66. f. G, H. (1779); *Fabricus, Mant. Ins.* ii. p. 78. n. 711. (1787); *Ent. Syst.* iii. pt. 1. p. 305. n. 154 (1793). Erycina Emylius, *Godart, Enc. Méth.* ix. p. 577. no. 64 (1819). Calospila Emylius, *E. Doubleday, List Lep. Brit. Mus.* pt. 2. p. 15 (1847). Lemonias Emylius, *Westwood, Gen. Diurn. Lep.* p. 459. no. 21 (1851).)
Hab. Guiana, Brazil (*Westw.*), Para. ♂, ♀. B.M.

♂. *Var.* (Area basali anticarum supra magis ferrugineo strigosa.)
Hab. Guiana, Antilles, Brazil, Pernambuco (*Westw.*), Ega. B.M.

This species, although allied to *Lucianus*, is quite distinct from it.

13. LEMONIAS LUCIANUS. (♂. Hesperia Lucianus, *Fabricius, Ent. Syst.* iii. pt. 1. p. 313. n. 185 (1793). Erycina Lucianus, *Godart, Enc. Méth.* ix. p. 587. n. 113 (1819). Lemonias Luciana, *Hübner, Samml. exot. Schmett.* i. pl. 36. f. 1, 2 (1806). Echenais Luciana, *Hübner, Verz. bek. Schmett.* p. 19. no. 122 (1816). Lemonias Crispus (synonym), *Westwood, Gen. Diurn. Lepid.* p. 459. n. 26 (1851).)
Hab. Tapajos. ♂, ♀. B.M.

The female of this species is very like the female of *Crispus*; it differs in its shorter hind wings, and the differently formed band of the front wings.

14. LEMONIAS PSEUDO-CRISPUS. (♂. Lemonias pseudo-Crispus, *Westwood, Gen. Diurn. Lep.* p. 459. n. 27 (1851). Papilio Crispus, *Cramer, Pap. Exot.* ii. pl. 118. f. F (1779).) Pl. VI. figs. 9, 10.

♀. (*L. nepiæ* simillima, major autem maculisque minus distinctis.)
Hab. Brazil, Ega. ♂, ♀. B.M.

15. **LEMONIAS NEPIA.** (♀. Lemonias nepia, *Hewitson, Gen. Diurn. Lepid.* pl. 73. f. 2 (1851); *E. Doubleday, List Lep. Brit. Mus.* ii. p. 16 (1847); *Westwood, Gen. Diurn. Lepid.* p. 459. n. 24 (1851).) Pl. VI. fig. 11.

Hab. Venezuela. ♂, ♀. B.M.

The male of this species is very like *pseudo-Crispus*, of which it may be only a local form; it is, however, smaller, and with less distinct markings.

16. **LEMONIAS NEPIOIDES**, sp. nov. (Pseudo-Crispus, *local var.*?)

♂ Lemonias Luciana ♀, *Hübner, Samml. exot. Schmett.* i. pl. 36. f. 3, 4 (1806). Pl. VI. figs. 12, 13.

♀. Alæ supra fuscæ: anticæ macula permagna media flava; punctis nonnullis basalibus nigro-fuscis; punctis sex submarginalibus albidis: posticæ area apicali ferrugineo punctata; punctis septem submarginalibus albis extus nigro marginatis; basi ferrugineo tincta: corpus fuscum. Alæ subtus albidæ, nigro punctatæ: anticæ ochreo tinctæ; limbo posteriore late fuscescente: posticæ macula apicali, duabusque analibus majoribus nigris: corpus albidum. Exp. alar. unc. $1\frac{1}{16}$.

Hab. Tapajos, Para. ♂, ♀. B.M.

The male scarcely differs from *pseudo-Crispus* ♂; the female, however, is smaller and rather differently coloured.

Alæ maris supra ferrugineæ nigro maculatæ, subtus pallidiores; posticæ angulo anali producto: feminæ supra fulvæ nigro maculatæ, subtus pallidiores.

17. **LEMONIAS CEREALIS.** (♀. Lemonias Cerealis, *Hewitson, Exot. Butterf.* iii. p. 118, pl. 59. f. 37 (1863).)

Hab. Tapajos. ♀. B.M.

Alæ maris supra ferrugineæ, apicibus late nigro-fuscis: anticæ feminæ ferrugineæ, area apicali nigro-fusca; posticæ fuscæ ferrugineo variæ: alæ subtus albidæ fusco et ochreo vel flavo variæ.

18. **LEMONIAS RHODOPE.** (♂. Lemonias Rhodope, *Hewitson, Exot. Butterf.* i. p. 116, pl. 58. f. 6, 7 (1853). ♀. Lemonias Ancile ♂, *ibid.* iii. p. 117, pl. 59. f. 32.)

Hab. Ega. ♂, ♀. B.M.

19. **LEMONIAS BUBO**, sp. nov. Pl. VI. figs. 14, 15.

♂. Alæ anticæ velut in *L. Rhodope*, Hew.: posticæ macula subanali geminata albida, aliter velut in *L. Rhodope.* Alæ subtus pallidiores: posticæ breviores, aliter velut in *L. Rhodope*: corpus fusco-albidum. Exp. alar. unc. $1\frac{3}{16}$.

♀. Alæ anticæ velut in *L. Rhodope* ♀: posticæ nigro-fuscæ, punctis duobus apicalibus; maculis tribus mediis ferrugineis, media majore.

Alæ subtus pallidiores, posticæ breviores, aliter velut in *L. Rhodope* ♀: corpus fusco-albidum. Exp. alar. unc. 1.

Differs from *Rhodope* in having the hind wings shorter, the hind wings of the male above with a large subanal whitish ochreous spot; of the female with three central round spots which take the place of the two interneural internal streaks seen in *Rhodope* ♀.

20. LEMONIAS MISENES. (Papilio Misenes, *Cramer, Pap. Exot.* ii. pl. 118. f. D (1779). Erycina Misenes, *Godart, Enc. Méth.* ix. p. 584. n. 96 (1819). Lemonias Misenes, *Westwood, Gen. Diurn. Lepid.* p. 459. n. 28 (1851). Echenais Misenessa, *Hübner, Verz. bek. Schmett.* p. 19. n. 119 (1816).)

Hab. Surinam (*Cramer*), Guiana (*Westw.*).

According to Hewitson, this species may be a *Lycæna*, 'Gen. Diurn. Lepid.' Corrections, p. 533. n. 459.

Alæ maris majores, ferrugineæ fusco cæruleoque, vel nigræ ferrugineo cæruleoque variæ: feminæ fuscæ ferrugineo variæ; area apicali posticarum ferruginea: subtus pallidiores, maculis striisque plurimis fuscis.

21. LEMONIAS RHESA.

♂. Lemonias Rhesa, *Hewitson, Exot. Butterf.* ii. p. 116, pl. 58. f. 15, 16 (1858).

♀. *L. Ancilæ* ♀, Hewits., simillima, major autem anticisque striis pluribus ferrugineis. Pl. VI. fig. 16.

Var. Maris apice anticarum minus nigrescente, maculis subtus aliter dispositis.

Hab. Tapajos (♂ B.M.) Ega. ♂, ♀. B.M.

22. LEMONIAS ANCILE. (♀. Lemonias Ancile, *Hewitson, Exot. Butterf.* iii. p. 117, pl. 59. f. 30, 31 (1863), but not ♂ f. 32.)

Hab. Ega. ♀. B.M.

23. LEMONIAS ZEANGER. (Papilio Zeanger, *Stoll, Pap. Exot.* pl. 37. f. 2, 2 B (1731). Erycina Zeanger, *Godart, Enc. Méth.* ix. p. 572. n. 36 (1819). Polystichtis Zeangira, *Hübner, Verz. bek. Schmett.* p. 18. n. 116 (1816).)

Hab. Surinam.

This species is marked in Doubleday's 'Genera' as in the British Museum Collection; we do not, however, possess it, but an allied species from the Amazons; the true *Zeanger* is evidently nearly allied to *L. Rhesa* of Hewitson, from which it principally differs in the marking of the basal portion of the front wings.

24. LEMONIAS CUPREA, sp. nov. (Lemonias Zeanger, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 17 (1851).) Pl. VI. figs. 17, 18.

♂. Alæ supra flavo-ferrugineæ; apice, margine postico costaque anticarum fuscis: anticæ puncto apicali violaceo, punctis tribus subanalibus marginalibus duobusque discalibus apud basin nigris; lineola obliqua subapicali a punctis tribus indistinctis, vel lineola interrupta distincta intus ad venam submedianam continuata, lineolisque tribus æquidistantibus discoideis, nigris: posticæ punctis quinque unoque anali triplici marginalibus nigris; margine interno albicante: corpus flavo-ferrugineum, thorace minime fuscescente. Alæ subtus albidæ cinerascentes, punctis striisque nigris velut in *L. Rhesa* ♂: subtus corpus albidum. Exp. alar. unc. 1¼.

Hab. Tapajos, Para. ♂. B.M.

The specimens of this species differ slightly in the arrangement of their markings; indeed the pattern does not appear to be exactly the same in any two individuals.

25. LEMONIAS THARA. (Lemonias Thara, *Hewitson, Exot. Butterf.* ii. p. 116, pl. 58. f. 16, 17 (1858).)

Hab. Tapajos. ♂. B.M.

26. LEMONIAS THERMODOË. (♂. Calospila Thermodoë, *Hübner, Zuträge Exot. Schmett.* f. 715, 716 (1806–27); *E. Doubleday, List Lep. Brit. Mus.* pt. ii. p. 15 (1847). Lemonias Thermodoë, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 16 (1851). Papilio Parthaon, *Dalman, Anal. Ent.* p. 46 (1823).)

Hab. Ega, Tapajos. ♂. B.M.

♂. *Var.* (Alis majoribus, fascia posticarum ferruginea magis ad apicem producta; maculis striisque subtus aliter dispositis.)

Hab. Brazil. ♂. B.M.

27. LEMONIAS BORSIPPA. (♂. Lemonias Borsippa, *Hewitson, Exot. Butterf.* iii. p. 118, pl. 59. f. 35, 36 (1863).)

Hab. Ega. ♂?, ♀. B.M.

28. LEMONIAS BORSIPPINA, sp. nov. Pl. VI. fig. 29.

♀. Alæ supra fuscæ, punctis quatuor ferrugineis: anticæ maculis quatuor apud basim flavo-ferrugineis; fascia discali, punctis quinque post cellam in serie arcuata positis maculisque septem submarginalibus nigro-fuscis: posticæ maculis tribus apud basim flavo-ferrugineis, area anali quadrate flava; punctis tribus subanalibus, uno apicali, maculaque geminata subapicali marginalibus nigris: corpus fuscum. Alæ subtus punctis submarginalibus continuis; posticæ linea discali irregulari nigra: aliter velut in *L. Borsippa* ♀: corpus cinereo-albidum. Exp. alar. unc. $\frac{7}{8}$.

Hab. Tapajos. B.M.

The following species are supposed to be males of the genus *Aricoris*; I think there can be no doubt that they are so, although at present I retain them at the end of this genus:—

Alæ maris supra cæruleæ, fusco, albo rariusque rufo variæ.

Section I.

Alæ supra cæruleæ; subtus albidæ fusco variæ, venis fuscis.

1. Aricoris Pythia. (Lemonias Pythia, *Hewitson, Exot. Butterf.* i. p. 116, pl. 58.)
Hab. Tapajos. ♂. B.M.

2. Aricoris amethystina, sp. nov. Pl. VII. fig. 7.
Alæ supra fuscæ, purpurascentes: anticæ fascia brevi media obliqua alba: corpus fuscum. Alæ subtus eis *L. Pythiæ* simillimæ: posticæ stria discoidali. Exp. alar. unc. $1\frac{1}{2}$.
Hab. Santarem. ♂. B.M.

This species is closely allied to the preceding one, of which it may be a local form, but differs in outline, the costæ of the hind wings being more direct, the lower portion of the outer margins of the fore wings not convex as in *Pythia*; in colouring it differs as follows:—hind wings above entirely blue, with only a very indistinct violaceous oval spot, and two dots near the anal angle, below with a discoidal streak within the hind-wing cell.

3. Aricoris Lagus. (Papilio Lagus, *Cramer, Pap. Exot.* ii. pl. 117. f. F, G (1779). Hesperia Lagus, *Fabricius, Ent. Syst.* iii. pt. 1. p. 306. n. 159 (1793). Polyommatus Lagus, *Godart, Enc. Méth.* ix. p. 680. n. 195 (1819). Theope Lagus, *E. Doubleday, List Lep. Brit. Mus.* ii. p. 6 (1847). Pandemos Lagus, *Westwood, Gen. Diurn. Lepid.* p. 440. n. 2 (1851). Pandemos Lagis, *Hübner, Verz. bek. Schmett.* p. 25. n. 193 (1816).) Pl. VII. figs. 2, 4.
Hab. Surinam (*Fabr.*), Ega, Fonteboa. ♂. B.M.
Var. Anticæ macula majore striaque interna apud basim violacea.
Hab. Ega. ♂. B.M.

4. Aricoris pythioides, sp. nov. Pl. VII. fig. 3.
♂. Alæ supra nigræ cærulescentes, costis nigris: anticæ macula magna discali alba, subhyalina, striaque interna apud basim cærulea albida: posticæ striis tribus subanalibus subcæruleis inter venas positis: corpus fuscum. Alæ subtus velut in *A. Lago*, Fabr.: corpus albidum. Exp. alar. unc. $1\frac{9}{16}$.
Hab. Ega. ♂. B.M.

Allied to *A. Lagus*, var., but of a different colour, with the markings more distinct, the hind wings of a totally different form, and with discal streaks disposed somewhat as in *A. Pythia* of Hewitson.

Var. Alæ posticæ supra nigrescentes et immaculatæ.
Hab. Ega. B.M.

5. ARICORIS CYANEA, sp. nov. Pl. VII. figs. 5, 6.

♂. Alæ supra cyaneæ nitidæ, macula valde indistincta anticis albida, apicibus costisque nigris : corpus fuscum. Alæ subtus velut in *A. Lago*, Fabr., posticæ autem basi nec flava : corpus albidum. Exp. alar. unc. 1$\frac{6}{8}$.

Hab. Brazil ?, Tapajos, Santarem. B.M.

Closely allied to *A. Lagus*, from which it differs in being of a totally different blue colour, with the basal spot very indistinct on the upperside, and the apices and costæ of the wings distinctly black; on the underside it only differs in having no basal orange spot on the hind wings; the hind wings differ in being shorter, but appear to vary slightly in form.

Var. Macula discali anticarum distincta alba geminata. Exp. alar. unc. 1$\frac{3}{8}$.

Hab. Brazil ?, Para. ♂. B.M.

Section II.

Alæ supra nigro-fuscæ, albo cæruleoque variæ, posticæ rufo variæ.

6. ARICORIS LATONA. (Lemonias Latona, *Hewitson, Exot. Butterf.* i. p. 115, pl. 58. f. 1, 2 (1853).)

Hab. Amazons. Coll. Bates & Hewitson.

7. ARICORIS IRENE. (Lemonias Irene, *Westwood, Gen. Diurn. Lepid.* p. 459. n. 29, desc. [foot-note] (1851); *Hewitson, Exot. Butterf.* i. p. 115, pl. 58. f. 3 (1853).) Pl. VII. fig. 8.

Hab. Para (*Westw.*), Ega. ♂. B.M.; ♀. Coll. Bates.

8. ARICORIS SIAKA. (Lemonias Siaka, *Hewitson, Exot. Butterf.* ii. p. 115, pl. 58. f. 10, 11 (1860).)

Hab. Ega. ♂. B.M.

Section III.

Alæ supra rufæ, subtus flavescentes.

9. ARICORIS CRUENTATA. Pl. VII. fig. 15.

♂. Alæ supra coccineæ, margine tenui, nigro; margine interno posticarum flavescente : corpus ochreo-fuscum, thorace rufo tincto, capite fuscescente, antennis nigris. Alæ subtus flavo-ochraceæ; anticæ costa, apice et margine postico fuscescentibus, margine ipso nigro; posticæ apice et angulo anali flavescentibus, apice et margine postico nigris : corpus ochreo-albidum, abdomine a latere coccineo, antennis albis nigro fasciolatis. Exp. alar. unc. 1$\frac{7}{8}$.

♀. Alæ supra flavescentes, marginibus nigro-fuscis, costa medio interrupta : subtus pallidiores, costa nec fuscescente, aliter velut in mari coloratæ. Exp. alar. unc. 1$\frac{5}{8}$.

Hab. Ega. ♂, ♀. B.M.; Coll. Bates.

Very like some species of *Mesene*, but larger, and with long palpi.

The following species form the genus *Tharops* of Hübner and Doubleday:—

THAROPS, *Hübner*.

Alæ supra cæruleæ viridesve, nigro fuscove variæ; alæ posticæ marium ad angulum analem productæ.

Section I.

Alæ posticæ maris subtrigonatæ, ad angulum analem paulo productæ, margine postico obliquo.

1. THAROPS MENANDER. (Papilio Menander, *Cramer, Pap. Exot.* iv. pl. 334. f. C, D ♀ (1782). Tharops Menander, *Hübner, Verz. bek. Schmett.* p. 109. n. 1179 (1816); *E. Doubleday, List Lep. Brit. Mus.* pt. ii. p. 14 (1847); *Hewitson & Westwood, Gen. Diurn. Lepid.* pl. 71. f. 11 ♂ (1851). Lemonias Menander, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 1 (1851). Erycina Petronius, *Godart, Enc. Méth.* ix. p. 570. n. 29 ♀ (1819).)

Hab. Guiana, Brazil (*Westw.*), Para. ♀. B.M.

2. THAROPS CORUSCANS, sp. nov. Pl. VI. fig. 19.

♀. Alæ supra cæruleo-virides: anticæ costa apud basin lineaque marginali cæruleis nitidis; area apicali fusca, a fasciolis duabus obliquis nigro-fuscis irregularibus, de costa ad nervulum medianum tertium currentibus, interrupta; cella maculas tres nigras includente; area interna a fascia submarginali maculisque septem interrupta, harum tres inter nervulos primum et secundum medianos, quatuorque inter nervulum primum et nervum submedianum positæ sunt: posticæ apice fusco; fasciola interna fasciisque tribus nigro-fuscis continuis, duabus marginalibus, tertiaque discali irregulari angulata: corpus fuscum. Alæ subtus ochreæ: anticæ margine interno griseseente, apicali fuscescente; punctis fuscis velut in *T. Menandro* positis, basalibus autem plus, et apicalibus minus distinctis; posticæ punctis velut in *T. Menandro*, magis autem separatis et in seriebus magis irregularibus positis; macula permagna apicali, altera anali, duabusque parvis inter eas positis: corpus album minime ochreo tinctum. Exp. alar. unc. $1\frac{5}{8}$.

Hab. Para. B.M.

We have two specimens of this species in the collection; it is closely allied to *T. Menander*, but larger and with the spots differently arranged, the hind margin of the fore wings more convex, the hind wings proportionally longer and the underside of a distinctly ochreous colour.

3. Tharops nitida, sp. nov. Pl. VI. figs. 20, 21.

♂. Alæ supra cæruleæ, nitidissimæ, certo situ viridescentes, apice anticarum ad cellæ finem nigro-fusco; seriebus duabus macularum nigrarum submarginalibus, externa maculis sex, interna quinque; maculis tribus post cellam unaque ad cellæ finem nigris: posticæ apice linea marginali fasciolaque apicali nigro-fuscis: corpus fuscum. Alæ subtus albæ: anticæ apice discique medio paulo fuscescentibus: alæ lineis duabus irregularibus discalibus, externa lunulata; linea submarginali valde indistincta simili, lineisque duabus apud basim irregularibus, indistinctis, ochreis: corpus albidum. Exp. alar. unc. $1\frac{9}{16}$.

♀. Alæ supra viridi-cæruleæ, fasciis duabus continuis submarginalibus nigro-fuscis; anticæ fasciolis tribus irregularibus de costa currentibus, duabus externis ad marginem internum continuatis sed vix indicatis; posticæ fascia discali irregulari maculata fasciolisque apud basim costalibus nigro-fuscis: corpus fuscum. Exp. alar. unc. $1\frac{5}{8}$.

Hab. Brazil. B.M.

Both sexes, the female in bad condition: allied to the preceding species.

4. Tharops Hebrus. (Papilio Hebrus, *Cramer, Pap. Exot.* pl. 50. f. E, F. (1779); *Fabricius, Mant. Ins.* ii. p. 77. n. 700 (1787); *Ent. Syst.* iii. pt. 1. p. 301. n. 141 (1793). Erycina Hebrus, *Godart, Enc. Méth.* ix. p. 570. n. 30. (1819). Lemonias Hebrus, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 4 (1851). Peplia Pelidna?, *Hübner, Verz. bek. Schmett.* p. 20. n. 141 (1816).)

Hab. Guiana, Brazil. ♂. Coll. Salvin; Coll. Bates.

5. Tharops Ion. (Lemonias Ion, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 7, descr. [footnote] (1851).) Pl. VI. figs. 22, 23.

Hab. Brazil (*Westw.*), Para. ♂, ♀. B.M.

6. Tharops felsina. (♀. Lemonias felsina, *Hewitson, Exot. Butterf.* iii. pl., f. 27, 28.)

Hab. Rio de Janeiro. B.M.

This species was placed by Mr. Doubleday, in his 'List of the Lepidoptera of the British Museum,' in the genus *Cremna*, under the name of *C. Selina*; I think, however, that Mr. Hewitson is right in placing it where he has, as it appears to be allied to *T. Ion*, Westw. ♀.

7. Tharops Cicuta. (Lemonias Cicuta, *Hewitson, Exot. Butterf.* iii. pl., f. 24–26.)

Hab. Para. ♂, ♀. B.M.

Our specimens of this species do not precisely agree with the figures by Mr. Hewitson; the male insect is of a more greenish

hue, and has broader black bands than in his figure; the female also has the spots of the upperside less distinct, and tinged with blue.

Section II.

Alæ posticæ maris ad angulum analem magis productæ, margine postico apud angulum paulo excavato.

8. **Tharops Pretus.** (Papilio Pretus, *Cramer, Pap. Exot.* ii. pl. 182. f. C, D (1779); *Fabricius, Mant. Ins.* ii. p. 36. n. 783 (1787); *Ent. Syst.* iii. pt. 1. p. 333. n. 266 (1793). Erycina Pretus, *Godart, Enc. Méth.* ix. p. 570. n. 28 (1819). Lemonias Pretus, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 3 (1851).)
Hab. Para. ♂. B.M.

9. **Tharops glaucoma.** (Periplacis glaucoma, *Hübner, Exot. Schmett. Zuträge*, f. 927, 928 (1806–27). Lemonias glaucoma, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 5 (1851).
Hab. Brazil. ♂. B.M.

10. **Tharops splendida**, sp. nov. Pl. VI. figs. 24, 25.

♂. Alæ supra virides, area costali anticarum certo situ violaceo-micante: anticæ margine postico apiceque fuscis; fascia submarginali subintegra, altera discali angulata, fasciola ad cellæ finem, macula cella inclusa maculaque discali interna nigris: posticæ apice fusco, margine interno fusco striam rubram includente; area anali maculis duodecim nigris regulariter positis, una apud basim, tribus infra, quatuor submarginalibus, quatuorque marginalibus: corpus fuscum, viridi variegatum. Alæ subtus albidæ, area costali anticarum externaque posticarum paulo violaceo fuscescentibus: anticæ costa et apice, maculis tribus discoideis, una costali, et sex discalibus parvis lunulatis in serie irregulari arcuata positis, rufo-fuscis: posticæ macula permagna costali, apice, maculaque anali, punctis quatuor marginalibus, sexque submarginalibus lunulatis, lunulis sex parvis discoideis striaque interna in serie irregulari positis, tribus discoideis duabusque indistinctis internis, rufo-fuscis: corpus album, abdomine ochreo tincto. Exp. alar. unc. 2.

♀. Alæ anticæ supra fuscæ cæruleo roratæ, apice rufescente, maculis velut in mari nigro-fuscis, seriei discoideæ albo extus marginatis: posticæ area costali cærulea, area anali fusca viridi rorata, angulo anali late rufescente, maculis analibus velut in mari positis, maculis autem submarginalibus et marginalibus ad apicem continuatis: corpus fuscum. Alæ subtus ochreo-albidæ: anticæ maculis tribus discalibus aliisque discoideis vix distinguendis velut supra positis rufo-fuscis, fascia marginali alteraque submarginali indistinctis ochreis: posticæ macula anali magna, una apud apicem, tribus parvis submarginalibus aliisque

velut supra valde indistinctis rufo-fuscis: corpus album. Exp. alar. unc. 2.

Hab. Para. ♂, ♀. B.M.

Closely allied to *T. glaucoma*, but very different, especially on the underside.

11. THAROPS HYALINA, sp. nov. Pl. VI. fig. 26.

♂. Alæ supra hyalinæ, margine interna anticarum maculisque tribus posticis analibus cæruleis; marginibus late nigro-fuscis: anticæ fascia lata subapicali venisque nigro-fuscis: posticæ venis, excipe ad cellæ finem, nigro-fuscis: margine interno ochreo tincto: corpus fuscum, capite albo punctatum, thorace præ rufo bimaculato. Alæ subtus velut supra: corpus album. Exp. alar. unc. 2.

Hab. Ega. ♂. B.M.

Hab. Para? ♂, ♀. Coll. Bates.

This beautiful insect is apparently allied to the preceding species; it does not, however, appear to resemble closely any form yet described.

The following species form the genus *Anatole*, of Hübner and Doubleday:—

Section I.

Alæ maris subtrigonatæ, posticæ elongatæ ad angulum analem rariusque ad marginis externi medium productæ: fuscæ, albo flavoque variæ.

1. ANATOLE ZYGIA. (Lemonias (maculata) Zygia, *Hübner, Samml. exot. Schmett.* Band i. pl. 35. f. 1, 2 [*var.* ♂ as ♀ 3, 4] (1806); *Westwood, Gen. Diurn. Lepid.* p. 458. n. 10 (1851). Anatole Zygia, *Hübner, Verz. bek. Schmett.* p. 24. n. 187 (1816); *E. Doubleday, List Lep. Brit. Mus.* ii. p. 15 (1847).)

Hab. Venezuela, Para. ♂, ♀. B.M.

2. ANATOLE EGAENSIS, sp. nov. Pl. VI. fig. 28.

♀. Alæ minores, supra punctis minoribus albis, aliter velut in *A. Zygia.* Alæ subtus maculis flavis fuscescentibus. Exp. alar. unc. $1\frac{1}{2}$.

♀. Alæ supra nigro-fuscæ, fascia media lata communi alba; anticæ punctis sex submarginalibus minimis albis; posticæ maculis septem submarginalibus nigris, tertia albo cincta, aliis indistinctissime extus albido cinctis: corpus nigro-fuscum. Alæ subtus basi posticarum magis fuscescente, fascia lata media velut supra nivea; aliter velut mari: corpus albidum. Exp. alar. unc. $1\frac{1}{2}$.

Hab. Ega. ♂, ♀. B.M.

The male of this insect is so much like *A. Zygia* that, unless we also possessed the female, it would be impossible to consider it anything more than a local form of that species.

3. Anatole Epone (A. Zygia, *var.*?). (Erycina Epone, *Godart, Enc. Méth.* ix. p. 580. n. 76 (1819). Lemonias Epone, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 11 (1851).)

Hab. Brazil. ♀ ? B.M.

4. Anatole Chea. (Lemonias Chea, *Hewitson, Exot. Butterf.* iii. p. 118, pl. 59 (1863).)

Hab. Amazon. Coll. Saunders & Hewitson.

5. Anatole caliginea, sp. nov. Pl. VII. fig. 16.

♂. Alæ supra nigro-fuscæ: anticæ punctis velut in *A. Zygia* albidis: posticæ linea indistincta subbasali albida, ocellis septem marginalibus nigris albido cinctis et ferrugineo circumcinctis: corpus fuscum. Alæ subtus area basali nivea flavo-olivaceo maculata, area apicali olivacea: anticæ fasciola obliqua nivea irregulari post cellam posita; margine postico maculis septem fuscis, intus lunulis niveis marginatis; margine inter venas alternatas niveo: posticæ margine postico late niveo, maculis punctisve septem submarginalibus nigris, anali a vena flava medio interrupta; venis apud marginem flavescentibus; ciliis supra et subtus albis fusco variis: corpus subtus olivaceo-fuscum. Exp. alar. unc. 1½.

Hab. Mexico. ♂. B.M.

We have one specimen of this species, in bad condition: it is allied to *A. Zygia*, and looks as if it might be the male of *A. Epone* ♀ ?; but the locality appears to me to be too widely distant to allow of this.

6. Anatole Orpheus. (Cremna Orpheus, *Hewitson, Gen. Diurn. Lepid.* pl. 71. fig. 8; *Westwood*, p. 456. n. 4 (1851); *E. Doubleday, List Lep. Brit. Mus.* pt. ii. p. 14 (1847).)

Hab. Brazil. ♂. B.M.

This species, although it has hitherto been placed in the genus *Cremna*, is evidently closely allied to *A. Zygia* and *A. caliginea*, sp. nov.

7. Anatole pulcherrima, sp. nov. Pl. VI. fig. 27.

♂. Alæ anticæ supra rufo-olivaceæ, costa basali et basi ferrugineis, maculis quatuor ovalibus subbasalibus fuscis; fasciola post cellæ extimum obliqua extus irregulari flavo-ferruginea de costa ad nervulum medianum primum pene currente, linea irregulari submarginali ferruginea maculaque subanali flavo-ferruginea; margine interno macula subtriangulari media interrupto: posticæ niveæ, basi fusca, apice fusco ferrugineo interrupto; maculis duabus analibus fuscis ferrugineo interruptis: corpus fuscum. Alæ subtus multo pallidiores, maculis nonnullis basalibus fuscis albido cinctis, aliter velut supra: corpus albido-fuscum. Exp. alar. unc. 1⅜.

Hab. Nauta (Amazon). ♂. B.M.

Intermediate between *Zygia* and *Albinus*.

8. Anatole Albinus. (Lemonias Albinus, *Felder, Wien. entom. Monatschr.* v. p. 101. n. 67 (1861).)
Hab. Venezuela. ♂, ♀. B.M.

9. Anatole Glaphyra. (Anatole Glaphyra, *Hewitson, Gen. Diurn. Lepid.* pl. 71. fig. 3 (1851). Lemonias Glaphyra, *Westwood, ibid.* p. 458. n. 9 (1851).)
Hab. Rio de Janeiro (Brazil). ♂, ♀. B.M.

Section II. Apodemia, *Feld.*

Alæ maris feminæque simillimæ, fuscæ ferrugineo et albo variæ ; velut in generibus Nemeobio *vel* Melitaca *maculatæ.*

10. Apodemia Erostratus. (Anatole Erostratus, *Hewitson, Gen. Diurn. Lepid.* pl. 71. f. 4 (1851); *E. Doubleday, List Lep. Brit. Mus.* ii. p. 15 (1847). Lemonias Erostratus, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 12 (1851).)
Hab. Venezuela. ♂, ♀. B.M.

11. Apodemia Epulus. (Papilio Epulus, *Cramer, Pap. Exot.* i. pl. 50. f. C, D (1779); *Fabricius, Mant. Ins.* ii. p. 71. n. 680 (1787); *Ent. Syst.* iii. pt. i. p. 292. n. 117 (1793). Erycina Epulus, *Godart, Enc. Méth.* ix. p. 585. n. 99 (1819). Lemonias Epulus, *Hübner, Samml. exot. Schmett.* Band i. pl. 38. f. 1–4 (1806); *E. Doubleday, List Lep. Brit. Mus.* pt. ii. p. 16 (1847); *Westwood, Gen. Diurn. Lepid.* p. 459. n. 25. (1851). Hamearis Epule, *Hübner, Verz. bek. Schmett.* p. 19. n. 127 (1816).)
Hab. Guiana (*Westw.*), Para, Brazil. ♂, ♀. B.M.
♀ *Var.* Alæ supra nigro-fuscæ, maculis ferrugineis variæ; anticæ, maculis quatuor mediis albidis a venis interruptis. Alæ subtus obscuriores.
Hab. Brazil. B.M.

Note. This species varies very much in depth of colouring; Brazilian specimens seem to be generally the lightest in hue.

12. Apodemia Mormo. (Lemonias Mormo, *Felder, Wien. entom. Monatschr.* iii., *Lepid. Fragm.* p. 271. n. 19 (1859).)
Hab. Salt Lake (California). Coll. Salvin.

13. Apodemia Aurinia. (Lemonias Aurinia, *Hewitson, Exot. Butterf.* iii. p. 115, pl. 58. f. 19, 20 (1863).)
Hab. Santarem. ♂, ♀. B.M.

14. Apodemia domina. (♀. Lemonias domina, *H. W. Bates, Ent. Month. Mag.* vol. i. p. 204. n. 82 (1864).)
Hab. Panamá. Coll. Salvin.

15. APODEMIA COLCHIS, *Felder*. Pl. VII. fig. 17.

♂. Alæ supra fuscæ, serie macularum albarum marginali alteraque submarginali rufescentium: anticæ serie macularum sex septemve albarum arcuata post cellam posita, unaque apud cellæ extimum geminata: posticæ punctis quinque albis discalibus in serie irregulari post cellam positis: corpus fuscum, collo rufescente. Anticæ subtus nigro-fuscæ, costa venis et area postica rufescentibus; maculis albis velut in *A. Epulo* dispositis variæ; duabus analibus punctisque fuscis marginalibus aliisque submarginalibus indistinctis albidis rufescentibus: posticæ olivaceæ, lineis subbasalibus lunulatis fasciisque duabus indistinctis marginalibus ferrugineis: corpus albidum. Exp. alar. unc. $1\frac{7}{8}$.

Hab. Brazil. ♂. B.M.

This species is allied to *Aurinia*, *Domina* and *Epulus*; it has very much the appearance of a female insect; but the hairy prolegs show it to be a male; the abdomen has been broken off.

16. APODEMIA STALACHTIOIDES, sp. nov. Pl. VII. fig. 18.

♂. Alæ supra fuscæ, punctis albis maculatæ, fascia submarginali ferruginea; margine nigro, ciliis albo variis: anticæ cella ferruginea: corpus fuscum, abdomine dimidio anali albo. Alæ subtus fuscæ, maculis albidis omnino maculatæ: posticæ macula interna ferruginea: aliter velut supra: corpus albido-fuscum, abdomine rufescente, a latere albo punctatum. Exp. alar. unc. $1\frac{5}{16}$.

Hab. Rio de Janeiro. ♂. B.M.

Allied to the preceding species.

The following species have been placed in the genus *Lemonias*; but I am doubtful whether they really belong to it:—

1. EMESIS? PETRONIUS. (♂. Hesperia Petronius, *Fabricius, Ent. Syst.* iii. pt. i. p. 324. n. 227 (1793); *Donovan, Ins. Ind.* pl. 43. f. 2 (1800). Erycina Petronius, *Godart, Enc. Méth.* ix. p. 573. n. 29 (1819). Lemonias Petronius, *Westwood, Gen. Diurn. Lepid.* p. 458. n. 2 (1851).)

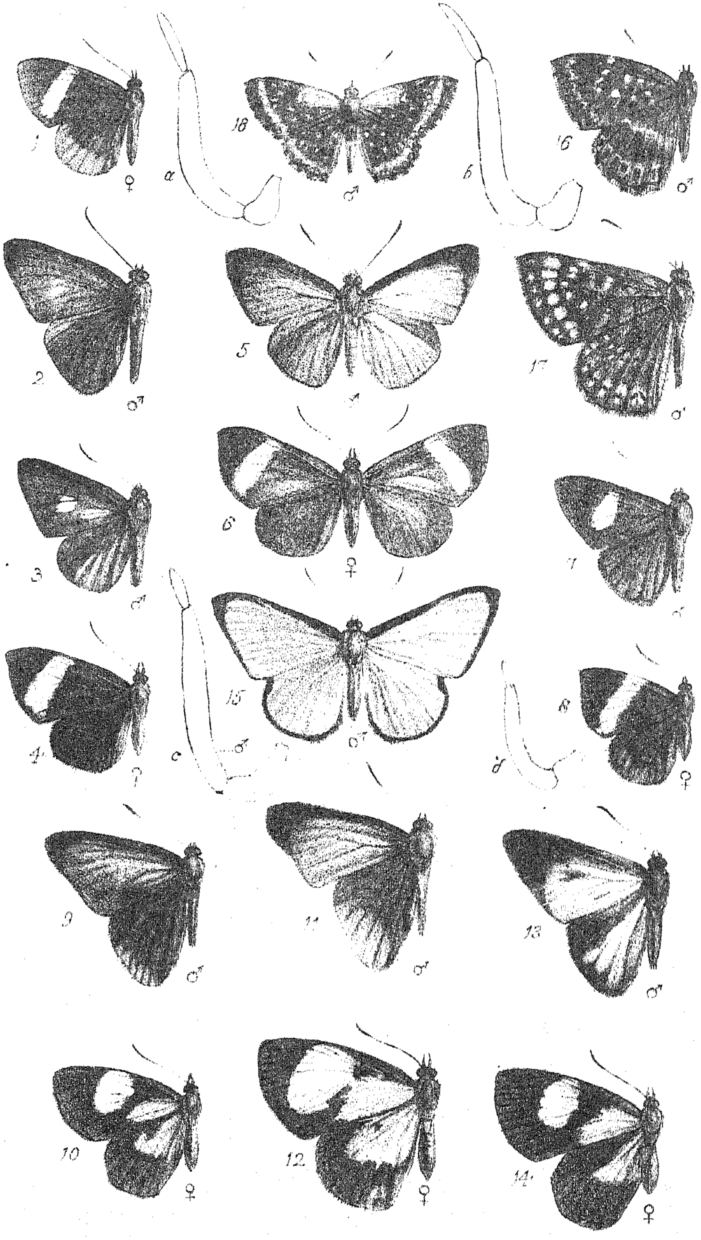
Hab. "In Indiis" (*Fabricius*).

Judging by Donovan's figure, this insect would appear to be a species of *Emesis*.

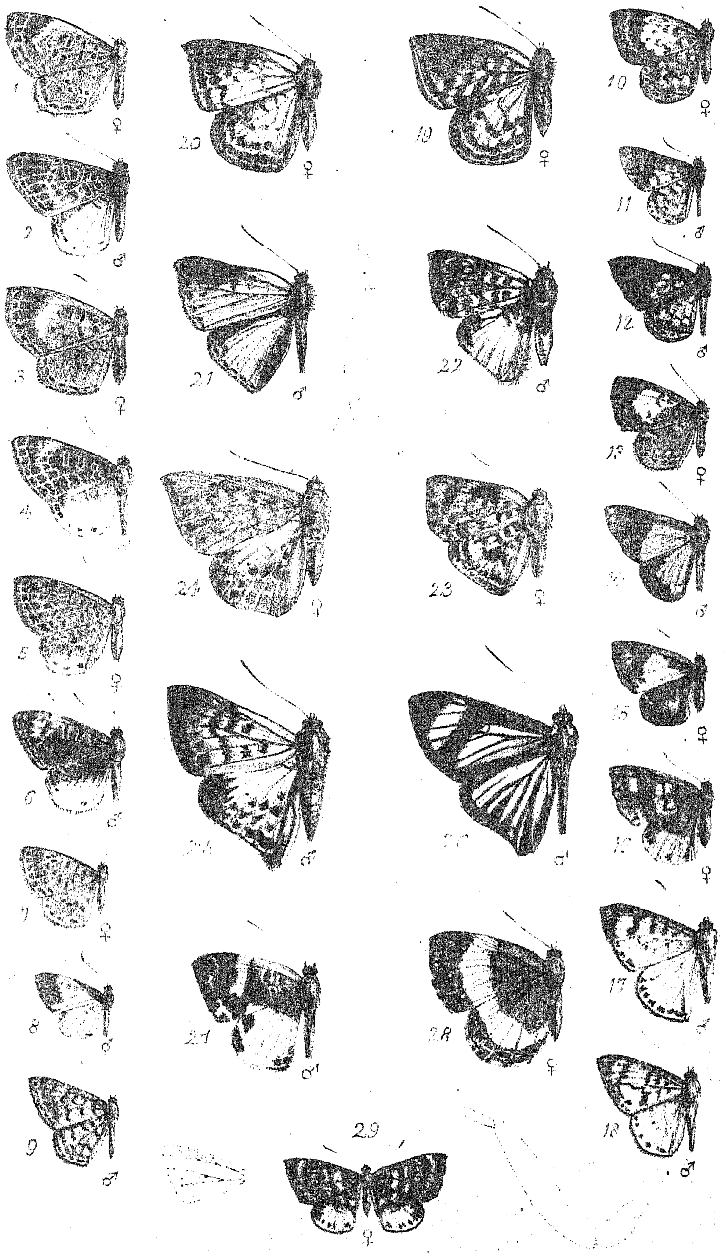
2. NYMPHIDIUM? KADENII. (Lemonias Kadenii, *Felder, Wien. ent. Monatschr.* v. p. 101. n. 68 (1861).

Hab. Venezuela.

Lemonias Ptolomæus and *L. agrius* of the 'Genera' form a new genus allied to *Charis; Lemonias Meris* is the type of another new genus allied to *Calydna*, for which Mr. Bates has proposed the MS. name of *Lasaia*.



Species of Aricoris &c.



Species of Lemonias &c.

Since writing the present paper, Dr. Felder has published his 'Novara Voyage' containing descriptions and figures of several additional species:—

LEMONIAS CÆCINA, p. 301. n. 403 } Allied to *Cerealis* of Hewitson, if
L. MARTIALIS, p. 301. n. 404 } not species of the genus *Charis*.
L. COLCHIS, ii. tab.37. f. 5, 6=sp. of *Apodemia*, p. 302, 'Gen. Nov. Feld.'
L. ALBINUS, *ibid.* f. 1–4.
L. SPERTHIAS, *ibid.* f. 9, 10=*Nymphidium Abaris* ♂ of Fabricius.
L. KADENII, *ibid.* f. 11, 12=*Nymphidium*, sp. nov.
L. CHILENSIS, *ibid.* f. 13, 14=*Anatole*, sp. nov.
APODEMIA MORMO, *ibid.* f. 15, 16.
A. SONORENSIS, p. 303. n. 407. Allied to *Mormo*.
DESMOZONA HEMIXANTHE, pl. 37. f. 17, 18=*Lemonias Sosybius*.
ARICORIS PETAVIA, pl. 38. f. 5, 6=*Pherephatte*, var.
A. BABIANA, *ibid.* f. 3, 4=? ♀ *Uranus*.

I have not introduced all the species of *Aricoris* into this paper, as several are so different from *Lemonias* in appearance, that they have never been confounded with the species of that genus: I have however represented the opposite sexes of several species in my second plate.

DESCRIPTION OF PLATES.

Plate VI.

Fig. 1. Lemonias Alector, *Hübn.*, ♀.
2, 3. L. violacea, *Butl.*
4, 5. L. Hübneri, *Butl.*
6, 7. L. leucocyana, *Hübn.*
8. L. Bolena, *Butl.*
9, 10. L. pseudo-Crispus, *Westw.*
11. L. nepia, *Hewits.*, ♂.
12, 13. L. nepioides, *Butl.*
14, 15. L. Bubo, *Butl.*
16. L. Rhesa, *Hewits.*, ♀.
17, 18. L. cuprea, *Butl.*
19. Tharops coruscans, *Butl.*
20, 21. T. nitida, *Butl.*
22, 23. T. Ion, *Westw.*
24, 25. T. splendida, *Butl.*
26. T. hyalina, *Butl.*
27. Anatole pulcherrima, *Butl.*
28. A. egaënsis, *Butl.*, ♀.
29. Lemonias Borsippina, *Butl.*
a. Neuration of Lemonias.
b. Palpus of Tharops Ion.
c. Palpus of Lemonias Thermodoë.

Plate VII.

Fig. 1. Aricoris inquinata, *Butl.* (? Pherephatte, var.).
2, 4. A. Lagus, *Cramer.*
3. A. pythioides, *Butl.*
5, 6. A. cyanea, *Butl.*
7. A. amethystina, *Butl.*
8. A. Irene, *Westw.*
9, 10. A. Epitus, *Cramer*, var. (Ega).
11. A. velutina, *Butl.*
12, 14. A. Epitus, *Cramer*, var. (Amazons).
13. A. serica, *Westw. & Hewits.*, ♂.
15. A. cruentata, *Butl.*
16. Anatole caliginea, *Butl.*
17. Apodemia Colchis, *Feld.* var.
18. A. stalachtioides, *Butl.*
a. Palpus of Anatole Zygia.
b. Palpus of Apodemia Erostratus.
c. Palpus of Aricoris cyanea, ♂.
d. Palpus of Metacharis regalis.

New Genera and Species, &c., of Neuropterous Insects; and a revision of Mr. F. Walker's British Museum Catalogue of *Neuroptera*, part ii. (1853), as far as the end of the genus *Myrmeleon*. By ROBERT M'LACHLAN, F.L.S.

[Read March 21, 1867.]

(With one Plate.)

I OFFER this paper as a contribution to a knowledge of the much-neglected Order *Neuroptera*. The insects noticed herein all pertain to that Order in its most perfect sense, all being *Planipennia*, to which division it is probable the term *Neuroptera* should be alone applied. The number of students of these insects being so very limited, and the collected material as yet so small, render any attempt to to work out the analogies, in a manner approaching the minuteness effected in the *Coleoptera* and higher forms of *Hymenoptera*, absolutely impossible; and the generic outline recently published by Hagen in his 'Hemerobidarum Synopsis Synonymica,' while of the utmost value as a foundation, shows how little is yet known, and how great are the difficulties of the subject. I have here not attempted any important redistribution or division of existing genera, and the few described as new are for the most part based on newly discovered forms. Nor is this paper at all exhaustive, so far as the materials in my own and other collections are concerned. Many interesting species exist in the collection of the British Museum which time and opportunity have not enabled me to notice, and I believe the Oxford Museum contains as many or more undescribed novelties.

I look upon the revision of Mr. Walker's Catalogue as by far the most important part of the paper. I will not express any opinion on the correctness of the descriptions in the Catalogue, on the principle that a critic is always too ready to find fault with his fellow-workers, and at the same time may be blind to his own shortcomings. Suffice it to say that the chief defect appears not to be inaccuracy of specific description, but a disregard in some instances of the sectional characters, whereby those workers who cannot obtain access to the types are liable to be misled; that specific distinctions are frequently founded on unimportant variations is also to be regretted, but is less serious. Against these objections is to be placed the weighty fact that at the time when the Catalogue was written, now fourteen years since, the subject was in an all but chaotic condition. The examination of the types of several hundred species has been a work of much labour; and I can scarcely hope that I have escaped errors of commission as well as of omission. I commenced with the intention of revising the whole of part ii. of the Catalogue, but decided upon stopping at the end of the genus *Myrmeleon*. I hope hereafter to write concerning the *Ascalaphidæ*, and reserve that part of the list for the acquirement of fuller information; the *Panorpidæ* were relinquished on account of the difficulties found in separating the North American forms. The evils arising from the retention of large numbers of specific forms under one generic head are exhibited in the *Neuroptera* in an intensified degree. The *Myrmeleonidæ*, for instance, stand greatly in need of more minute division; and the rich genus *Chrysopa* is made of several more or less well-marked groups,—a wide field for the researches of a monographer.

I have before said that an exhaustive work is not here attempted; and if my notes shall smooth the path for future students, their purpose will have been served.

SIALIDÆ.

Genus CHAULIODES, *Latreille*.

CHAULIODES PUSILLUS, n. sp. Lurido-brunneus. (Antennæ mutilatæ). Caput subtriangulare, lurido-brunneum; ocellis flavis; oculis nigris; labro magno, antice rotundato. Prothorax duplo longior quam latior, capite angustior, lateribus fere parallelis. Alæ fere æquales, obtusæ, breves, pallide griseo-brunneæ, immaculatæ; venis venulisque brunneis. Pedes brunnei. Abdomen saturate fuscum; appendicibus flavis, superioribus fortiter deorsum incurvatis, parallelis, inferioribus parvis, subdilatatis (♂). Long. corp. $6\frac{1}{2}'''$; exp. alar. 1″ 6‴.

Hab. in India orientali?? In collect. auct.

Antennæ (broken) with the two basal joints brownish testaceous. Head elongate subtriangular; the crown with a median longitudinal impressed line; lurid brown, with some yellowish impressed spaces on the sides posteriorly; labrum large, broader than the clypeus, strongly rounded in front. *Eyes* black. *Ocelli* yellow. *Prothorax* much narrower than the head, twice as long as broad, the sides almost parallel; lurid brown. *Meso-* and *metathorax* lurid brown. *Wings* nearly equal, the posterior only slightly smaller than the anterior; broad, obtuse; pale greyish brown; unspotted, or with an appearance of three small darker spots between the first and second sector; veins and veinlets dark brown; the anterior wings with about seventeen transverse veins in the costal area, which become closer and oblique towards the apex; transverse discal veins very few. *Legs* lurid brown, the tarsi more obscure. *Abdomen* dark fuscous, almost black beneath;

appendices yellow; the superior curved strongly under and parallel; the inferior short, somewhat dilated, appearing to arise from the bases of the superior, and directed outwards.

I possess one male of this small species, but with no record of locality. It is possibly Indian.

CHAULIODES JAPONICUS, n.sp. Fuscus. (Antennæ mutilatæ). Caput pallide flavidum, supra infra et utrinque medio nigrum; mandibulæ piceo-fuscæ. Prothorax capite vix angustior, paullo longior quam latior, fere parallelus, supra convexus, postice medio linea impressus; fuscus, infra flavidus. Alæ elongatæ, latæ, pallide cinereo-hyalinæ, apicibus vix acuminatis: anticæ inconspicue fusco nebulosæ; pterostigmate elongato, fusco; venulis costalibus venisque longitudinalibus fusco-nigris; venulis transversalibus discalibus paucis, pallidis: posticæ anticis vix pallidiores. Pedes pallide fusci, subtus flavi; genibus, tibiarum apicibus tarsisque saturate fuscis. Abdomen fusconigrum (♀). Long. corp. 1″ 4‴; exp. alar. 4″ 2‴.

Hab. in Japonia. In collect. auct.

Brown. (Antennæ broken in my example). *Head* pale yellowish, shining, the middle above occupied by a quadrate blackish space, which is interrupted by a yellowish line margining a median longitudinal impressed line, the sides narrowly black; beneath, the middle is shining blackish; the space before the mandibles, and these latter, pitchy fuscous; *ocelli* yellow; *eyes* dark shining fuscous. *Prothorax* brown above, yellow beneath; narrower than the head, rather longer than broad, the sides nearly parallel, the anterior margin rounded; upper surface very convex posteriorly, with a lanceolate median impressed space, and with irregular impressed spaces at the sides. *Meso-* and *metathorax* pale fuscous. *Wings* long, broad, the apices somewhat narrowed, and the apical margin slightly excised; cinereo-subhyaline: *anterior wings* with indistinct fuscous clouds, pterostigmatical region fuscous; costal veinlets numerous, blackish fuscous; longitudinal veins blackish fuscous; the discal and apical transverse veinlets very few and fine, pale: *posterior wings* slightly paler, less clouded, excepting at the apex; veins and veinlets coloured as in the anterior. *Legs* pale fuscous above, yellow beneath; the knees, the apical portion of the tibiæ, and the tarsi wholly dark fuscous. *Abdomen* blackish.

There is another Japanese species, *C. grandis* (*Hemerobius grandis*), Thunberg, which, as far as I am aware, is known only from Thunberg's description and coarse figure; it is very different from *C. japonicus*.

Genus CORYDALIS, *Latreille*.

CORYDALIS BATESII, n. sp. (Plate VIII. fig. 1). Brunnea. Antennæ graciles, simplices, flavæ nigro terminatæ. Caput supra et infra intense

piceo-brunneum, dense et minute punctatum; mandibularum apicibus palpisque nigris. Prothorax longior quam latior, supra convexus, fere parallelus, postice ter impressus, luride brunneus. Mesothorax metathoraxque prothoracem latidudine subæquantes. Alæ elongatæ: anticæ cinereæ, pone medium fuliginosæ; nebulis magnis plurimis apud radium, in spatio subcostali margineque costali fusco-nigris; punctis in cellulis albis; venulis costalibus plerumque, transversalibus omnino nigris, nonnullis basin versus crassis; venis longitudinalibus plerumque testaceis: posticæ anticis paullo latiores; venulis transversalibus nigris. Pedes fusci; tarsis tibiarumque apicibus (præcipue posteriorum) flavidis (♀). Long. corp. 2″ 3‴; exp. alar. 5″ 2‴.

Hab. Ega, Brazil. In collect. auct.

Brown. *Antennæ* very slender, not toothed, not more than two-thirds the length of the body, yellow, the tips black. *Head* above and beneath dark pitchy brown, finely and closely punctured, the tooth at the lower angles, acute; margined with yellow at the insertions of the mandibles; *ocelli* yellow; *eyes* dark olivaceous; *mandibles* (♀) scarcely so long as the head, black at the tips, with three closely placed teeth beneath the apex internally; *palpi* black. *Prothorax* longer than broad, scarcely dilated posteriorly, the sides nearly parallel, very convex above, smooth, dull brown, with three short impressed spaces behind. *Meso-* and *metathorax* small, scarcely broader than the prothorax, each broader than long, pale brown. *Wings* very long, somewhat acute, narrow: *anterior wings* cinereous, a large space beyond the middle clouded with pale smoky fuscous; numerous large blackish blotches in the anterior portion, one at the pterostigmatical region, several in the subcostal area, and others under the radius; small white dots in the cellules; costal veinlets all simple except about two, very strong, each veinlet mostly black at each end and testaceous in the middle, but all black beyond the middle of the costa; transverse and gradate veinlets of the disk black, some of those towards the base much incrassated; longitudinal veins, excepting where they traverse the dark blotches, testaceous: *posterior wings* slightly broader than the anterior, paler; some smoky clouds on the anterior margin; costal and all transverse veinlets black. *Legs* fuscous, paler beneath; all the tarsi and the apical portion of the tibiæ (especially the posterior) yellowish ochreous; finely pilose. *Abdomen* fuscous (the colours probably altered).

For this magnificent insect I am indebted to my friend Mr. H. W. Bates. It was the only *Corydalis* he saw during eleven years' residence on the Amazons.

Corydalis crassicornis, n. sp. (Plate VIII. fig. 2). Pallide brunnea. Antennæ testaceo-fuscæ, nigro terminatæ, corpori fere æquales, valde robustæ; articulo basali fortiter inflato; articulis reliquis (basin versus exceptis) subtus singulatim dente recto brevi instructis. Caput latis-

simum, rugulosum, testaceo-fuscum, circum ocellos marginemque anteriorem nigrum; mandibulis valde elongatis, concoloribus, præter apices obscuriores; palpis nigris; ocellis flavis. Prothorax brevis, fere quadratus, supra planiusculus; testaceo-fuscus, flavo maculatus, postice impressus, rugosus. Mesothorax metathoraxque prothorace vix angustiores, castaneo-fusci. Alæ cinereo-hyalinæ: anticæ punctis plurimis albis; area costali pallidiore, apicem versus infuscata; area subcostali fere omnino infuscata; venulis costalibus albidis, nigro terminatis, apicem versus omnino nigris; venulis transversalibus nigris; venis longitudinalibus testaceis: posticæ vix pallidiores; venulis costalibus nonnullisque transversalibus nigris, reliquis testaceis. Pedes flavido-brunnei, tarsis genibusque intense fuscis. Abdomen flavidum; appendicibus elongatis pilosiusculis; superioribus apicibus approximatis, dilatatis, abrupte deorsum inflectis; inferioribus dimidio et ultra brevioribus, cylindricis, sursum incurvatis (♂). Long. corp. sine mandib. et append. 1″ 10‴; long. mandib. 1″ 8‴; exp. alar. 5″ 4‴.

Hab. Texas. In collect. auct.

Pale brownish testaceous. *Antennæ* as long as, or longer than, the body, very thick, brown, the sutures of the joints, and the 3 or 4 terminal joints, black; basal joints very greatly inflated, bulbous; each of the other joints, excepting those in the basal fourth, furnished beneath with a short straight triangular tooth; towards the base a commencement of this structure is seen in the presence of a tubercle only. *Head* very broad, the tooth at the posterior angles acute; above flattened, finely rugose, posteriorly with three impressed coarsely reticulated spaces; deep cavities in front before the base of each antenna; colour pale brownish testaceous, blackish round the ocelli, and narrowly margined with blackish in front; palpi black; ocelli yellow; eyes brown; mandibles very long, almost equalling the body, sulcated at the base above, rugose, the roughness occasioned by numerous closely placed transverse series of minute tubercles, the inner edge with small blackish tubercles, colour the same as the head, but darker at the tips. *Prothorax* nearly quadrate, scarcely longer than broad, hardly perceptibly dilated behind; brownish-testaceous, the anterior margin narrowly blackish; surface uneven, a lanceolate median longitudinal impression behind, and several raised spaces on each side, which are rather paler than the ground-colour. *Meso-* and *metathorax* nearly equal, slightly narrower than the hinder edge of the prothorax, brown. *Wings* elongate, cinereo-hyaline: *anterior wings* with numerous small white dots in the cellules; the pterostigmatical region dark fuscous; the subcostal area dark fuscous, with paler spaces; the first 3 or 4 costal veinlets and those towards the apex altogether blackish, the rest yellowish white, black at each end; all the transverse discal veinlets black; longitudinal veins testaceous: *posterior wings* scarcely paler than the anterior; the subcostal area infuscated; costal veinlets, and some of the discal, black. *Legs* pale brown, the tarsi, knees, and apical half of tibiæ dark fuscous. *Abdomen* yellowish; appendices very long, slightly pilose; superior nearly cylindrical, dilated at the base, the tips approximating, dilated and truncated, but suddenly bent downwards and produced into a short process; inferior not half so long as the superior, cylindrical, curved upwards at the tips.

CORYDALIS INAMABILIS, n. sp. (Plate VIII. fig. 3). Brunnea. Antennæ corpore paulo breviores, modice incrassatæ, pallide fuscæ, nigro terminatæ; articulo basali inflato; reliquis, basalibus exceptis, singulatim subtus dente recto acuto instructis. Caput luteo-fuscum, antice pallidius, rugulosum; ocelli flavi; oculi plumbacei; palpi nigri flavo annulati; mandibulæ valde elongatæ, intense fuscæ, basi pallidiores. Prothorax longior quam latior, supra convexus, postice leviter latior; brunneus. Mesothorax metathoraxque prothorace latiores. Alæ elongatæ, angustæ, cinereo-hyalinæ: anticæ punctis numerosis albis; area subcostali fusco-nebulosa; venulis costalibus nigris, basin versus pallido interruptis; venulis transversalibus nigris; venis longitudinalibus flavidis: posticæ concolores; venulis costalibus nonnullisque discalibus nigris. Pedes pallide brunnei, tarsis tibiarum apicibusque obscurioribus. Abdomen fuscum; appendicibus elongatis; superioribus biarticulatis, articulo ultimo sinuato, apice deorsum incurvato; inferioribus brevioribus, geniculatis, apicibus subclavatis (♂). Long. corp. sine mandib. et append. 1″ 4‴; long. mandib. 1″; exp. alar. 4″.

Hab. Texas. In collect. auct.

Pale brown. *Antennæ* scarcely shorter than the body, moderately thick, pale brown, the three or four terminal joints black; basal joint stout and bulbous; the succeeding joints, excepting those in the basal fourth, each provided near its extremity beneath with a short straight triangular acute tooth. *Head* yellowish brown, the anterior margin narrowly black; finely roughened above and beneath, and posteriorly with coarsely reticulated spaces; *ocelli* yellow; *eyes* plumbaceous; *palpi* black, with broad whitish yellow annulations. *Mandibles* very long, slender, finely rugose, pale brown, the apical portion dark. *Prothorax* longer than broad, sensibly widened posteriorly; the upper surface convex, with a lanceolate median longitudinal impression behind, and roughened raised spaces along the sides, colour pale brown. *Meso-* and *metathorax* slightly broader than the prothorax, nearly equal. *Wings* long and narrow, subacute, cinereo-subhyaline: *anterior wings* with numerous small white dots everywhere in the cellules, excepting in the costal area; subcostal area with fuscous spaces; pterostigmatical region slightly yellowish; costal veinlets black, those near the middle whitish in the centre; all the discal and apical transverse veinlets black; the longitudinal veins yellow, the subcostal and radius interrupted with fuscous: *posterior wings* scarcely paler than the anterior; costal veinlets and most of the discal and apical transverse veinlets black; the longitudinal veins, and the discal transverse veinlets towards the base, yellow. *Legs* pale yellowish brown, the tarsi and tips of the tibiæ more obscure. *Abdomen* pale fuscous; appendices long, yellowish, slightly pilose; superior appendices sinuated, bisarticulate, the tips bent under; inferior appendices *geniculated, the apices directed* upwards and slightly dilated.

This species is closely allied to *C. crassicornis*, and has the same antennal structure; it differs in its apparently smaller size, *annulated palpi*, and a slightly different formation of the appendices.

In the genus *Corydalis* the character of *size*, when taken from a single individual of a species, is not of much importance, as these insects vary greatly in this respect, not only sexually, but also in different examples of the same sex.

MYRMELEONIDÆ.

Genus PALPARES, *Rambur*.

PALPARES FALCATUS, n. sp. Rufo-fulvus. Antennæ rufescentes. Caput rufo-fulvum; occipite postice maculis tribus, antice vitta transversa quadrimaculata, maculis nigris. Palpi nitentes, piceo-brunnei. Thorax vitta media, et utrinque, fuscus. Alæ latæ, albido-hyalinæ: anticæ ad apicem obtusæ, dente parvo instructæ, puncto ad marginem dorsalem prope basin nigro-fusco; maculis costalibus numerosis, obliquis, alteris ad apicem, duabus magnis plus minusve confluentibus basin versus, fasciis duabus transversis, obliquis, quarum una angusta, ante medium, altera lata pone medium, nebulaque magna apicali, fuscis: posticæ apicibus sursum productis, valde falcatis, margine sinuato; maculis nonnullis costalibus et ante apicem fasciisque tribus latis, quarum una media fere interrupta ad marginem dorsalem apicem versus producta, altera completa pone medium, tertia ad apicem, fuscis: venis venulisque rufescentibus. Pedes rufo-fusci, albido pilosi, nigro spinosi. Abdomen fuscum, vix rufescens; ♂ appendicibus brevibus, curvatis, fere clavatis, intus spinis brevibus nigris dense instructis. Long. corp. 2″; exp. alar. 5″ 3‴.

Hab. Birmah. In collect. Mus. Brit. (♂) et auct. (♀).

Antennæ reddish. *Head* pale reddish-fulvous, darker about the basal joints of the antennæ; front yellowish; occiput in front with a transverse vitta composed of four black spots, the two middle ones somewhat united, behind or above with three black spots placed in a triangle, and a short line on each side of the upper ones. *Thorax* reddish fulvous, a median narrow fuscous stripe, and the sides broadly fuscous; prothorax narrowly transverse, and, with the mesothorax, clothed with reddish hairs; metathorax clothed more thickly with whitish hairs; the breast reddish brown. *Wings* much dilated beyond the middle, hyaline: *anterior wings* obtuse at the end, but the extreme apex produced into a sort of tooth; the apical margin and apical half of dorsal sinuated; on the dorsal margin near the base is a small black shining spot; costal margin with numerous oblique fuscous spots, a collection of fuscous spots on the costa beyond the pterostigma; a fuscous line at the postcostal furcation; two large, more or less confluent, fuscous spots in the upper part of the disk towards the base; a narrow oblique fuscous fascia before the middle, broadest at its commencement below the radius, and becoming gradually narrower until its junction with the dorsal margin; a broad oblique fascia beyond the middle, becoming paler and cloudy on the dorsal margin, so that it appears as a very large blotch extending from below the apex two-thirds across the wing, after which it is indistinct; a pale fuscous cloudy space before the apex, below the collection of subapical costal spots; the tooth-like apical production fuscous; besides these markings some of the principal veins are dotted with fuscous, and smaller dots in the pterostigmatical region: *posterior wings* slightly shorter and narrower than the anterior; the apex produced upwards and ending in a strongly curved hook, the margins sinuated as in the anterior; the oblique costal spots are less numerous and do not extend beyond the middle of the costa; a collection of spots at the commence- of the elevated apex, beyond the pterostigma; a mark at the post-costal furcation; three broad transverse fasciæ, one about the middle commencing below the radius, and almost interrupted in the middle, produced towards the apex on the dorsal margin; the second beyond the middle, commencing on the costal margin, the edges sinuated; the third occupying the apex, dilated in the middle, so that it is almost triangular in form: in all the wings the pterostigmatical region is somewhat opaque, and dirty whitish; all the veins and veinlets reddish, becoming darker where they traverse the fuscous markings. *Legs* dark pitchy brown or reddish brown, short and stout, rather thickly clothed with short whitish hairs and strong blackish spines. *Abdomen* reddish brown, darker at the base, which portion is clothed with fine whitish pubescence; ♂, appendices short, not half the length of the penultimate segment, curved, the apices thickened, hairy, the inner side thickly set with short black spines.

This insect is most allied to *P. contrarius*, Walker, but very distinct, especially through the strongly falcate posterior wings. With that species, and with *P. gigas*, Dalman, and *P. mœstus*, Hagen, it forms a peculiar group which no doubt will eventually be generically separated, and to which the term *Symmathetes* may be applied. The male above described is the only one known in the four species.

PALPARES FULVUS, n. sp. Rufo-brunneus. Antennæ nigræ; clava acuminata. Caput rufo-griseum; vertice valde fornicato, vitta media nigra; fronte flava; palpis nigris, gracilibus, labialibus perelongatis.

Thorax supra rufo-fulvus, sparse nigro pilosus, vitta media nigra (metathorax albido pilosus); infra (et supra utrinque) intense niger. Alæ latæ, apicibus acutiusculis: anticæ fulvæ, subhyalinæ, margine apicali late brunneo; punctis costalibus dorsalibusque (ad basin), nonnullisque discalibus pone medium, nigris; maculis duabus magnis basin versus, fascia interrupta ante medium, macula costali permagna pone medium, fasciaque apicali nigris; venis venulisque testaceis, in maculis nigris: posticæ albæ, maculis duabus oppositis basalibus, macula costali ante apicem fasciisque duabus, latissimis, quarum una ante medium, altera pone medium cum prima vix confluente, circum marginem apicalem extensa, nigris. Pedes intense nigri. Abdomen rufo-brunneum. ♀. Long. corp. 2″ 4‴; exp. alar. 5″ 8‴.

Hab. in Africa australi?. In collect. auct.

Antennæ nearly as long as the thorax, the club attenuated, black. *Head* greyish; the vertex strongly inflated, with a deep longitudinal impressed line, a black median vitta expanding in front in form of an Y, and with a small black dot on each side; face yellow, somewhat reddish round the eyes; *palpi* black, the labial very long and slender, the terminal joint abruptly clavate and somewhat piceous at the extreme apex. *Eyes* dark grey, with darker streaks. *Thorax* reddish fulvous, above with a median black vitta, the sides and the under surface intensely black; *prothorax* rather broader than long, dilated posteriorly, clothed sparingly with black hairs; *metathorax* clothed sparingly above and densely at the sides beneath with long white pubescence. *Wings* broad, acute at the apex, the apical margin slightly sinuated: *anterior wings* pale fulvous, subhyaline, the apical margin broadly margined with brown; the costal area with black spots only on the margin at the base, afterwards also with several larger oblique ones; the median vein at the base, and the base of the dorsal margin, with deep black spots; and there are numerous small blackish dots towards the apex and on the disk; a large black blotch near the base below the radius, a smaller one at the postcostal furcation on the dorsal margin; before the middle a very large black blotch below the radius, more or less connected with a dorsal one and forming a somewhat interrupted fascia; beyond the middle a still larger black blotch extended to the costal margin and reaching more than half across the wing; a clouded blackish fascia formed of two connected spots just before the apex; costal vein black, the other veins and veinlets reddish testaceous, but black where they traverse the black markings: *posterior wings* white, pinkish towards the apex; a few black spots on the basal portion of the dorsal margin; a large black blotch near the base, opposite to a smaller one at the postcostal furcation on the dorsal margin; a broad black fascia before the middle much dilated on the dorsal margin; another broad black fascia beyond the middle, with a furcation more or less confluent with the first fascia, and an extension round the apical margin; a large black spot on the costa just before the extreme apex; these black markings occupy more of the wing than does the white ground-colour; veins testaceous in the white portion, black in the black. *Legs* short and very stout, deep black. *Abdomen* reddish brown, more obscure in the apical half; the two basal segments show a trace of the black dorsal thoracic vitta; the basal segments with short white pubescence.

I have one female example of this grand insect, but without any indication of locality; it is possibly African.

PALPARES IMMENSUS, n. sp. Testaceus, albo hirsutus. Antennæ nigræ. Caput prothoraxque flava, vitta media nigra; palpi nigri. Mesothorax metathoraxque densissime albo hirsuti. Alæ anticæ elongatæ, angustæ, acutæ, hyalinæ, ad costam basinque nigro reticulatæ; maculis discalibus vittisque duabus, quarum una obliqua ante medium marginem dorsalem versus, altera in apice, nigro-fuliginosis, pallido reticulatis, striga elongata attenuata ante marginem dorsalem nigro-fuliginosa: posticæ anticis paulo breviores, hyalinæ; fasciis duabus, quarum una valde irregularis in dimidio basali, altera, interdum interrupta, pone medium, strigis duabus apicalibus strigaque interrupta ante marginem dorsalem nigris. Pedes nigri; tarsorum articulo ultimo unguibusque brunneo-testaceis. Abdomen rufo-testaceum, apice nigro; ♂ appendicibus nigris, sursum incurvatis. (♂ ♀.) Long. corp. 2″–2″ 6‴; exp. alar. 5″ 6‴–6″.

Hab. "Damara Land" (*Andersson*). In collect. auct.

Antennæ about the length of the mesothorax, black. *Head* yellow, the vertex strongly inflated and somewhat reddish anteriorly; a deep median impressed longitudinal line; face bright yellow, with a shining black line on each side; palpi shining black, the articulation between the penultimate and terminal joints yellowish. A broad black median longitudinal line extends along the vertex, prothorax, and anterior portion of the mesothorax. *Prothorax* very narrow, thrice as broad as long, yellow; divided into three transverse divisions by means of the impressed lines. *Meso-* and *metathorax* densely clothed with long white pubescence both above and beneath, yellowish; the metathorax with two conspicuous testaceous spots. *Anterior wings* very long, narrow, acute, hyaline; the costal margin very straight; pterostigma yellowish; costal space with numerous transverse black lines; the basal fourth of the wings strongly reticulated with black; on the disk are several blackish spots with pale reticulations, viz. one near the base, another before the middle, and two opposite ones beyond the middle; an oblique blackish streak near the middle of the dorsal margin and a straight one on the apex; a long blackish line extending from near the apex to beyond the middle of the dorsal margin, placed very near the margin, but leaving a hyaline space between it and the extreme edge; a number of small black spots between the pterostigma and the apex; costal vein, subcosta, and radius black, the rest of the veins and veinlets yellowish. *Posterior wings* similar in form to the anterior, and scarcely perceptibly shorter, hyaline; costal transverse black spots less in number; the basal half of the wing with a very irregular broad angulated black fascia with a long irregular prolongation almost reaching the base; beyond this is another fascia composed of two large more or less united black spots, whereof the lower one is very much the larger; two lines and some black points in the apex; a line before the dorsal margin, which is not complete but more or less broken up into spots; colouring of the veins as in the anterior wings; the knobbed appendage at the base testaceous. *Legs* black, with strong black spines and white hairs intermingled; tarsi brown; tibial spurs as long as the two first tarsal joints, slightly curved; claws nearly as long as the last tarsal joint. *Abdomen* not nearly so long as the wings, stout in the female, reddish testaceous, the apex and segmental divisions blackish, clothed with fine white pubescence: in the male the appendices are short, black, nearly cylindrical, the tips flattened, curved strongly downwards, with the tips directed upwards, forming almost a semicircle.

I possess three examples (1 ♂, 2 ♀) of this enormous insect from Damara Land.

PALPARES SPARSUS, n. sp. Flavus. Antennæ nigræ. Caput flavum, nigro univittatum. Thorax dense albido hirsutus, flavus, nigro-trivittatus; pectus flavo nigroque ornatum. Alæ ad apicem dilatatæ, subobtusæ, albido-hyalinæ, punctis parvis vix regulariter nigro conspersæ; margine costali punctis majoribus; pterostigmate et (♂) spatio subcostali pallide flavis; venis venulisque flavis: posticæ (♀) maculis tribus reticulatis nigris. Pedes flavi; tarsis nigris. Abdomen flavum, utrinque et infra late nigrum; ♂ appendicibus cylindricis regulariter curvatis, flavis. ♂ ♀. Long. corp. 2″; exp. alar. 3″ 11‴–4″ 7‴.

Hab. "Damara Land" et Zambesi. In collect. auct.

Pale yellow. *Antennæ* black, nearly the length of the thorax. Head pale yellow; the vertex above with a median broad black line expanding about the base of the antennæ; face yellow, with a quadrate black spot; *palpi* blackish, yellow at the articulations; *eyes* leaden black. *Prothorax* very short, much broader than long, with a deep transverse channel in the middle, the margins on either side of which are strongly elevated. The whole of the *pro-*, *meso-*, and *metathorax* is clothed above and beneath with fine long whitish pubescence; pale yellow, above with three broad longitudinal black vittæ; beneath black, with large yellow spots. *Wings* much dilated beyond the middle, subobtuse; pale whitish, hyaline, the broad apical marginal region more opaque; pterostigma, the attachments at the base, and the subcostal area pale yellow; costal margin with rather large subquadrate black spots; the whole of the rest of the wing pretty regularly sprinkled with small black spots, which are less numerous on the posterior wings; veins and veinlets pale yellow, excepting those placed in the black spots, where they are blackish. *Legs* orange yellow, the tips of the tibiæ and the whole of the tarsi shining black; spines black; spurs and claws pitchy. *Abdomen* pale yellow, with whitish hairs at the base, and afterwards with minute black bristles; a broad band on each side and the under surface black; terminal segment wholly yellow; appendices cylindrical, regularly curved, yellow.

The above description applies to a male taken by Mr. T. Baines on the Daka River in the Zambesi valley in March.

The female from Damara Land differs in wanting the yellow tint on the subcostal area; the small dots on the posterior wings are less numerous, and in these wings are three rather large blackish reticulated spots, one on the disk about the middle, and two others placed obliquely a little within the pterostigma, the larger of which is near the costal margin; the reticulation is paler, almost colourless (excepting in the black markings). The tibiæ have a vestige of a black mark externally.

As I have seen but one example from each locality, respectively male and female, I am unable to say if the small differences above noted are actually sexual or dependent upon local influences.

PALPARES DAMARENSIS, n. sp. Fuscus, flavo varius. Antennæ nigræ. Caput valde convexum, nigro-fuscum; labro flavo. Prothorax fuscus, antice flavo marginatus (interdum flavus, fusco signatus). Mesothorax metathoraxque fusci, obscure flavo varii. Alæ antice elongatæ, obtusæ, pallide flavo-albidæ; maculis costalibus (ad basin numerosis) et ad marginem dorsalem fasciisque tribus interruptis plus minus nigris aut fusco-nigris; pterostigmate venis venulisque flavis: posticæ anticis fere æquales, pallide flavo-albidæ; macula magna basin versus, fasciis duabus vel interruptis vel postice furcatis maculisque marginalibus apicalibusque nigris. Pedes nigri. Abdomen testaceum, apicem versus obscurius. ♀. Long. corp. 1″ 5‴; exp. alar. 3″ 2‴.

Hab. "Damara Land" (*Andersson*). In collect. auct.

Antennæ about the length of the thorax, black, the club obtuse, but not abruptly capitate. *Head* blackish, with a few whitish hairs, the vertex very convex, with a median impressed longitudinal line; *clypeus* and *labrum* yellow; *palpi* black. *Eyes* castaneous. *Prothorax* very short, much widened posteriorly, and with the posterior angles strongly produced downwards; the margins all raised, the middle space somewhat flattened; dark fuscous, with a few white hairs, the anterior portion broadly yellow. In one example (more immature?) the whole prothorax is bright yellow, with blackish spots in the middle. *Mesothorax* blackish fuscous, with few whitish hairs; a large yellow spot occupies the posterior lobe, above which are other yellowish markings. *Metathorax* similarly coloured, with three yellowish spots.

The sides and under surface of the thorax are blackish, with yellow markings thickly clothed with white hairs. *Anterior wings* elongate, obtuse, pale yellowish white, with black markings; pterostigma yellow; a series of broad transverse costal spots, a large number of small spots on the basal fourth of the wing, and also along the apex and dorsal margin; three transverse fasciæ more or less divided into large spots, one at about a third from the base, another at two thirds, and the last following the pterostigma, the spaces between these fasciæ without dots, excepting on the margins; costal veins blackish, the rest of the veins and veinlets yellow, except where they traverse the black markings, with which they are there concolorous. *Posterior wings* similar in form to the anterior, scarcely shorter, coloured the same but with fewer small black spots, viz. several very indistinct transverse costal ones and some larger ones on the dorsal margin; on the disk at about one-quarter of the length from the base is a large isolated spot; at about the middle a broad angulated fascia, sometimes interrupted towards the dorsal margin, where it is forked; a similar, but straighter, fascia at a fourth of the length from the apex, and some apical spots forming a greatly interrupted third fascia; veins and veinlets coloured as in the anterior. *Legs* black, with black spines and white hairs; tibial spurs nearly as long as the first three tarsal joints, dark shining castaneous, slightly curved; claws similarly coloured, very long. *Abdomen* yellowish testaceous, more obscure towards the apex.

I possess two examples from Damara Land. I had at first referred this and the next species to *Tomateres*, to which in their comparatively small size and general form they bear much resemblance; but the antennæ, at any rate in *P. damarensis*, are not so short and abruptly capitate as in the species of that genus.

PALPARES FLAVO-FASCIATUS, n. sp. Fuscus. (Caput prothoraxque desunt.) Mesothorax metathoraxque fusco-nigri, cano hirsuti. Alæ anticæ elongatæ, subacutæ, subhyalinæ, densissime fusco-nigro reticulatæ; fasciis tribus completis obliquis maculisque numerosis, haud reticulatis, flavis: posticæ albæ; fasciis tribus latis fuscis, quarum duæ ad marginem dorsalem trifurcatæ. Pedes nigri. Abdomen attenuatum, fuscum; appendicibus divaricatis, curvatis, subclavatis, nigris (♂). Long. corp. (sine capite et appendicibus) 1″ 11‴; exp. alar. 3″ 9‴.

Hab. "Damara Land" (*Andersson*). In collect. auct.

(Head and prothorax wanting in my example). *Meso-* and *metathorax* blackish, clothed with hoary hairs. *Anterior wings* subhyaline, densely reticulated with blackish, and with very numerous small yellow spots, costal margin black and yellow alternately; three bright yellow oblique transverse fasciæ without reticulation, viz. one, nearly equal in breadth throughout, at about a quarter of the length of the wing from the base, another, interrupted, at about a third from the apex, and another, complete, just before the apex; these fasciæ are all very broadly margined with black on each side, the space between the last and the extreme apex black spotted with yellow; the dorsal margin is occupied with black and yellow alternate spaces; neuration for the most part blackish, but yellow in the yellow fasciæ and spots. *Posterior wings* similar in form to the anterior, very slightly narrower and shorter; white, more transparent in the basal fourth; three broad and irregular transverse black fasciæ, one rather before the middle, trifurcate on the dorsal margin, another following this and somewhat similar in form, and the third occupying the apex and enclosing a large yellow spot; some of the costal veinlets, and the point where the postcosta joins the dorsal margin, blackish. *Legs* shining black, with black spines and a few whitish hairs; tibial spurs as long as the first three tarsal joints, and with the claws dark shining brown. *Abdomen* very slender, fuscous, slightly pubescent; appendices widely diverging, curved, black, somewhat clavate at the tips.

I possess one male example of this beautiful species from Damara Land. It appears to be somewhat allied to *Palpares spectrum*, Rambur. The unfortunate absence of the head precludes a correct estimation of its generic position.

Genus CRAMBOMORPHUS, n. g.

I propose this name for the *Palpares hæmatogaster* of Gerstaecker, which may be thus generically diagnosed.

Antennæ longe clavatæ. Palpi labiales robusti, articulo ultimo longe clavato, valde incrassato. Prothorax brevis, transversus. Caput thoraxque valde hirsuta. Alæ anticæ posticæque fere æquales, coriaceæ, elongatæ, perangustæ, subfalcatæ; marginibus apicali dorsalique late sinuatis; area costali ad basin paulo dilatata, biareolata, postquam uniareolata; posticæ postcosta furcata, anastomosi marginali ramo recurvo. Pedes breves, robusti, calcaribus paulo curvatis.

This genus should probably come next to *Stenares*.

I have little doubt that *C. hæmatogaster* is the same as *Myrmeleon sinuatum*, of Olivier, 'Encyc. Méthod.' viii. p. 121, 4. I possess one example from Damara Land.

Genus ECHTHROMYRMEX, n. g.

Antennæ graciles, clava acuminata. Alæ maculatæ, ad basin augustatæ, ad apicem valde dilatatæ, rotundatæ; area costali uniareolata; subcosta et radio ad apicem fortiter curvatis; venulis transversalibus pernumerosis; areolis fere quadratis: *posticæ postcosta simplici.* Pedes breves, valde spinosi, calcaribus tarsorum articulo 1° æqualibus; plantula magna, penicillata.

This genus in the structure of the veins of the posterior wings nearly approaches the South American *Dimares*, Hagen, and is altogether aberrant in the Asiatic fauna. The palpi are broken off in the single example I have seen.

ECHTHROMYRMEX PLATYPTERUS, n. s. Pallide flavescens. Antennæ rufo-ochraceæ, indistincte pallido annulatæ. Caput pallide flavum; fronte circum antennas fusco, clypeo flavo; occipite antice vitta transversa angustata fusca, postice fusco signato. Prothorax elongatus, lateribus fere parallelis; flavus, fusco signatus. Alæ hyalinæ: anticæ dimidio apicali flavo tincto; nebula magna pone medium maculisque in area subcostali, inter venas 4^{m} et 5^{m}, pone pterostigma, et ad marginem apicalem dorsalemque fuscis; venis longitudinalibus fuscis, flavo striatis: posticæ hyalinæ; fascia lata apicali fusca, albo maculata, intus albo marginata. Pedes pallide flavi, nigro spinosi. Abdomen flavidum, fusco annulatum; segmento ultimo spinis brevibus numerosis nigris instructo. (♀?) Long. corp. 1″ 5‴; exp. alar. 3″ 11‴.

Hab. Baghdad. In Mus. Brit.

Antennæ reddish ochreous, with very indistinct pale rings. *Head* pale yellow; occiput with a narrow transverse fuscous line in front, and fuscous markings behind; face pale fuscous about the base of the antennæ; clypeus yellow, with two impressed fuscous dots; mandibles tipped with black (palpi broken off). *Prothorax* longer than broad, narrower than the head, the sides nearly parallel, with a few long hairs, the anterior angles rounded; yellow, with two fuscous connected lines in the middle, and fuscous at the sides. *Meso-* and *metathorax* yellow, spotted with fuscous. *Wings* hyaline: *anterior wings* slightly excised below the extreme apex; the apical half tinged with yellowish; a very broad indistinct fuscous blotch beyond the middle, reaching halfway to the dorsal margin; the subcostal area and the space between the 4th and 5th principal veins spotted with fuscous; a fuscous blotch on the costa beyond the pterostigma, and another in the apex; the apical margin and apical portion of the dorsal with regular rounded fuscous spots; besides these markings there are numerous minute fuscous dots; pterostigma yellowish; veins and veinlets fuscous, the principal longitudinal veins streaked with whitish yellow, and many of the transverse veinlets wholly whitish yellow; the row of minute gradate veinlets bordering the apical marginal region conspicuously white: *posterior wings* with a very broad fuscous fascia occupying the apical half, broadly margined with milky white internally, and with several white spaces, viz. a large apical spot in which are two or three fuscous dots on the margin, a small spot at the pterostigmatical region, a larger spot on the dorsal margin towards the basal side of the fascia, and one or two smaller ones in the middle on this margin; basal veins and veinlets for the most part fuscous, the longitudinal veins with whitish streaks; the row of minute gradate veinlets bordering the apical marginal region very conspicuously white from being placed in the dark fascia. *Legs* pale yellow, with numerous black spines; the tarsi beneath very thickly spinous; spurs and claws piceous. *Abdomen* yellowish, with brown rings; terminal segment provided with numerous short black spines.

The single example of this curious species was taken at Baghdad during Sir Henry Loftus's expedition to Persia.

Genus CREAGRIS, *Hagen*.

CREAGRIS NIGRO-STRIGATUS, n. sp. Nigricans, brunneo varius. Antennæ nigræ, tenuiter flavo annulatæ; clava obtusa, subtus excavata. Prothorax longior quam latior, antice angustior, marginibus lateralibus rectis. Alæ elongatæ, subfalcatæ, fere æquales, hyalinæ: anticæ vittis nigris, quarum una subcostali, altera obliqua submedia, longis, cæteris inter has brevioribus; margine dorsali ante medium litera V nigro signato; punctis nigris numerosis; pterostigmate nigro, externe albido; venis albidis nigrisque: posticæ anticis angustiores, ad apicem acutiores; punctis paucis apicicalibus nigris; pterostigmate albido. Pedes nigri, brunneo varii, nigro spinosi, cano hirsuti. Abdomen supra nigrum, infra griseo-ochraceum, sparse cano pilosum. Long. corp. 1″ 2‴; exp. alar. 2″ 7‴.

Hab. Natalia. In collect. auctoris.

Blackish; thorax varied with brown. *Antennæ* about the length of the thorax, stout; the club gradually formed and very obtuse, the underside of it concave: black, finely and closely annulated with yellowish ochreous; these annulations are broader on the club; the basal joint beneath wholly ochreous. *Head* dull blackish, the mouth yellowish ochreous; labial palpi with the last two joints nearly equal in length, the last in the form of an elongate shining black club. *Prothorax* rather longer than broad, the lateral margins nearly parallel for more than half their length, the anterior portion suddenly contracted, so that the prothorax here is much narrower than the other part, the anterior angles rounded; the anterior margin nearly straight, slightly excavated; an evident transverse impressed line proceeds across the prothorax at the commencement of the contraction, and the anterior part beyond this line is slightly elevated, forming a sort of collar; the colour is blackish varied with reddish brown. *Mesothorax* much broader than the prothorax, the anterior lobe placed in a deep emargination of the lateral lobes and with a deep longitudinal median impressed line, the hinder margin straight, coloured as in the prothorax. *Metathorax* narrower than the mesothorax. *Wings* elongate, broadest beyond the middle, the apex acute, the apical margin excised, hence giving the apex a subfalcate form: *anterior wings* with broad black vittæ, of which one commences at the base and extends to the pterostigma, occupying the whole subcostal space and margining the radius on its lower edge, another commences also at the base, following the course of the fifth principal longitudinal vein along its superior branch as far as the apical series of gradate veinlets, which it follows almost up to the apex; between these are about four shorter streaks proceeding from the apical series of gradate veinlets along the longitudinal veins towards the middle, the lower much longer than the others; a V-shaped black mark at the termination of the postcostal vein; pterostigma internally black, joining the subcostal streak, externally whitish with a slight reddish tinge; all the apical and dorsal veinlets trifurcate or quadrifurcate, those on the apical margin marked with black at the apex of the furcations; the veins and veinlets partly black and partly whitish: *posterior wings* one-fourth narrower than the anterior, the apex more produced; without markings, excepting a blackish spot on the pterostigma internally, and one or two small blackish dots below it towards the dorsal margin; veins and veinlets mostly whitish, the radius strongly streaked with blackish. *Legs* blackish, varied with brownish, with strong black spines intermixed with scattered hoary hairs; spurs slightly longer than the first tarsal joint, regularly curved, shining brown. *Abdomen* one-fourth shorter than the wings, slender, dull blackish above, greyish ochreous beneath, sparingly clothed with short hoary pubescence.

I possess one example of this strongly marked species from Port Natal; it is allied to, and of the same form as, *C. mortifer*, Walker.

Genus GLENURUS, *Hagen**.

GLENURUS PUSTULATUS, n. sp. Nigricans, flavo varius. (Antennæ mutilatæ). Caput flavum; vertice nigricante, inter oculos late transverse sulcato. Prothorax duplo longior quam latior, angustus, antice productus, flavus, fusco varius; hoc et metathorace infra flavis, utrinque nigris. Mesothorax medio nigricans. Alæ hyalinæ, cæruleo iridescentes, macula magna apicali pustulata æneo-nigra; pterostigmate albo: anticæ ad apicem latæ, rotundatæ; punctis numerosis in area subcostali nigris; plagis tribus nigro reticulatis, quarum una dorsali, duabusque apicalibus; venulis transversalibus inter venas 4^{m} et 5^{m} late nigro marginatis: posticæ anticis paulo longiores, dimidio angustiores; subcosta alba, nigro punctata. Pedes flavi, nigricante punctati. Abdomen supra nigrum, flavo signatum; infra flavum. Long. corp.?; exp. alar. antic. 2″ 8‴; postic. 2″ 11‴.

Hab. Ceylon. In collect. auctoris.

Antennæ (broken) with the basal joint yellowish. *Head* small; the

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* In this genus Hagen includes a mass of what appear to me very heterogeneous materials. Among them is the European *pantherinus*, for which Brauer proposed the generic term *Dendroleon*. I believe the publication of both names was so nearly simultaneous that it is difficult to decide which has priority; but as the group will without doubt be eventually split up, both terms may then be retained, that of *Dendroleon* being limited to *pantherinus* and its immediate allies.

posterior portion yellow, forming a triangular space; vertex tuberculated, blackish; a broad deep transverse channel between the eyes in front; the lower portion of the head pale yellowish; mandibles yellowish, blackish internally; palpi very small, yellowish. *Eyes* very large, subglobose, blackish. *Prothorax* very narrow, twice as long as broad, the anterior portion widened and produced; yellowish above, clouded with fuscous, with fuscous hairs. *Mesothorax* much broader than the prothorax, yellowish above, with three large black spots in the middle, a fine wavy blackish line on the attachments of the wings, with a small black point. *Metathorax* blackish, yellowish at the sides. Beneath, the whole of the pro-, meso-, and metathorax is yellow, with a black longitudinal line on each side. *Wings* hyaline, with beautiful blue iridescence, pterostigma white; on each of the wings, near the apex, beyond the pterostigma, is a large rounded inflated blackish spot with brassy reflection: *anterior wings* much dilated and rounded at the apex, the extreme apex forms a small little-evident point, beneath which the margin is slightly excised; the subcostal space is occupied by numerous small black spots (interspersed with larger ones) following the transverse nervules; between the fourth and fifth principal longitudinal veins the transverse oblique nervules are broadly margined with black; a large irregular blackish spot beyond the end of the postcosta on the dorsal margin (at the base of the oblique branch of the fifth vein); two blackish reticulated clouds at the apex; the edge of the wings, and the veins and veinlets, have short yellowish hairs; subcosta whitish, interrupted with the black spots of the subcostal space; costal veinlets whitish, very numerous, simple at the base, but mostly forked beyond the middle; apical and dorsal marginal veins mostly bisbifurcate; the longitudinal veins (excepting the subcosta), and many of the transverse nervules, mostly blackish: *posterior wings* slightly longer than the anterior, one-half narrower, apical formation similar but more pointed; subcosta whitish, with short blackish lines; most of the longitudinal veins blackish, and of the transverse nervules whitish; costal nervules all simple, except about and beyond the pterostigma; these wings are without markings, save the whitish pterostigma, and blackish inflated apical spot common to all the wings. *Legs* yellowish, with numerous blackish points forming the bases of blackish bristle-like hairs; first and last tarsal joints very long, the others small; tibial spurs slender, nearly straight, with incurved tips, shining testaceous, nearly as long as the three first joints; claws long. *Abdomen* slender, blackish above; first, second, and third segments posteriorly finely margined with yellow; fourth segment with a cuneiform yellow spot commencing in the middle, its apex reaching the posterior margin; fifth segment yellowish in the middle; the whole underside, excepting the apex, yellow.

I have one example (♂ ?) from Ceylon.

GLENURUS (?) JAPONICUS, n. sp. Pallide brunneus. Antennæ elongatæ, fuscæ, clava nigra. Caput supra flavo-fuscum, infra flavum; fronte inter oculos nigro signata. Prothorax elongatus; marginibus lateralibus nigro hirsutis, fere parallelis; supra flavo-brunneus. Mesothorax metathoraxque supra brunnei, flavo varii; infra flavi, utrinque late nigri. Alæ hyalinæ, argenteo iridescentes, elongatæ, ante apicem dilatatæ, ad apicem acutæ, pterostigmate albido: anticæ macula obliqua incurvata dorsali punctoque ad apices venarum $4^{\text{æ}}$ et $5^{\text{æ}}$ nigricantibus; vena subcostali, radio, 4^{o} 5^{o}-que nigris, flavo-albido punctatis; venulis transversalibus plerumque albido-hyalinis: posticæ anticis longitudine æquales, angustiores, acutiores; plaga magna subapicali marginem dorsalem versus nigra; venis venulisque plerumque albido-hyalinis. Pedes flavescentes, punctis spinisque nigris; tarsi nigro terminati. Abdomen gracile, brunneum, basi flavo-albido signatum. Long. corp. 1″ 3‴; exp. alar. 3″.

Hab. Japonia. In collect. auctoris.

Antennæ long, placed close together at the base, brown, slightly pubescent; club long and slender, black, concave beneath. *Head* above very obtusely triangular, yellowish brown, with darker clouds; beneath pale yellow; vertex shining black between the eyes; palpi very small, yellow; mandibles yellow, tipped with black. *Eyes* very large, subglobose, dull blackish. *Prothorax* about twice as long as broad, the sides nearly parallel but notched in the anterior portion, very pale yellowish brown, with black hairs; posteriorly on each side with a pale impressed cornucopia-shaped marking, blackish brown between these markings and with a blackish-brown line on each side. *Meso-* and *metathorax* above blackish brown, varied with yellowish. The whole of the three thoracic segments beneath is yellow, with a broad black line on each side. *Wings* elongate, hyaline, with silvery reflections; the two pairs equal in length: *anterior wings* dilated before the apex, which latter is acute with a very slight emargination below it; pterostigma whitish, with a blackish cloud internally; a large, oblique, curved blackish mark rather before the middle of the dorsal margin, and a small blackish spot at the end of the fourth and fifth principal longitudinal veins near the apex; subcosta black, with numerous yellowish spots; radius (3rd vein) and fifth longitudinal vein also black, with more distant yellowish interruptions; transverse costal nervules very numerous, for the most part simple, but furcate towards the apex, the whole of these, and many of the other transverse nervules, and some of the smaller longitudinal veins, whitish hyaline, the rest blackish; apical and subapical veins furcate or bis-bifurcate; the margins and most of the veins and veinlets finely pubescent: *posterior wings* one-fourth narrower than the anterior, more acute at the apex; pterostigma whitish, internally and externally obscure; a large curved reticulated blackish blotch near the apex towards the dorsal margin; apical margin broadly greyish (a trace of a similar margination is also seen in the anterior wings); some of the longitudinal veins obscure; most of the transverse nervules whitish hyaline; finely pubescent as in the anterior wings. *Legs* yellow, the tibiæ and tarsi with black dots and spines; tarsi tipped with black; first and last tarsal joints longer than the others; tibial spurs as long as the first tarsal joint; claws very long, directed downwards, nearly straight, with incurved tips, shining brown.

I possess two examples from Japan. It is placed provisionally in *Glenurus*; but it possesses many characters in common with *Creagris*, from which it differs in the great length of the antennæ, and gradually dilated wings.

CHRYSOPIDÆ.

Genus CHRYSOPA, *Leach*.

A. *Labro antice truncato aut rotundato.*

CHRYSOPA COGNATA, n. sp. Viridi-flava. Antennæ alis paulo breviores, brunneæ, basi flavæ. Caput viridi-flavum, facie punctis quatuor nigris, quarum duobus sub antennarum articulis basalibus, duobus elongatis lateralibus; palpi fulvi; labro antice truncato. Prothorax, mesothorax metathoraxque viridi-flavi, immaculati; ille fere quadratus, angulis anticis obliquis. Alæ elongatæ, subacutæ, pterostigmate viridi-brunneo, elongato; anticæ venulis costalibus, postcostalibus, nonnullis cubitalibus, gradatisque plerumque nigris, reliquis viridis. Pedes viridi-flavi; tarsi fulvi. Abdomen viridi-flavum. Long. corp. 5–7‴; exp. alar. 1″ 6‴–1″ 10‴.

Hab. Cambodia, China, Japonia. In collect. auctoris.

Greenish yellow. *Antennæ* scarcely so long as the wings, pale brown, the base yellow. *Head* greenish yellow, vertex inflated but with a deep broad transverse depression in the centre; face with four black spots, of which one is placed below the base of each antenna, and one, more elongate, on each side below the upper ones; palpi fulvous. The whole of the *thorax* and *abdomen* greenish-yellow; *prothorax* nearly quadrate, the anterior angles oblique, a deep transverse channel in the posterior third. *Wings* elongate, somewhat acute; pterostigma long, greenish-brown, with numerous short transverse veinlets: *anterior wings* with all the costal veinlets (excepting the pterostigmatical), the postcostal, several of the cubital, the two first of those between the radius and its sector (partly), and most of the gradate series black; the rest of the veins and veinlets pale green; about 30 costal veinlets before the pterostigma; about 18 veinlets between the radius and its sector; the veinlet at the base of the subcostal area placed rather before the fourth costal one: *posterior wings* narrower than the anterior, slightly shorter; the costal veinlets before the pterostigma, the veinlets between the radius and its sector (mostly only in the upper half of each veinlet), and most of the gradate veinlets black, the others pale green. All the veins and veinlets in both pairs of wings have fine short black hairs. *Legs* pale greenish yellow; tarsi fulvous; claws dilated at the base.

I possess numerous examples, which do not vary, from the several localities above mentioned. It is closely allied to *C. septempunctata* and *C. bipunctata*, but differs in always wanting the spot between the antennæ, &c.

CHRYSOPA TRIPUNCTATA, n. sp. Flavo-ferruginea. Antennæ alis paulo longiores, ferrugineæ; articulo basali flavo, extus linea nigra. Caput flavum; maculis quinque nigris, quarum duabus elongatis in vertice, una inter antennas, duabus subrotundatis in fronte sitis. Labrum et palpi ferruginea. Prothorax fere duplo latior quam longior, ferrugineus. Mesothorax metathoraxque flavo-ferruginei. Alæ hyalinæ, cellulis nonnullis mediis albidis; pterostigmate flavo-ferrugineo, elongato: anticæ elongatæ, ad apicem rotundatæ; venulis costalibus gradatis, et inter radium et sectorem (illisque in parte basali), nigris; venis longitudinalibus venulisque cæteris albido-flavis; cellula cubitali subquadrata: posticæ venulis costalibus, et inter radium et sectorem, nigris, cæteris fere omnino albido-flavis. Pedes flavi, tarsi ferruginei; unguiculis basi dilatatis. Abdomen ochraceum (♀). Long. corp. 4‴; exp. alar. 11‴.

Hab. Australia. In collect. auctoris.

Antennæ about the length of, or slightly longer than, the wings, ferruginous, the basal joint yellow with a black line externally. *Head* yellow, the vertex convex, two parallel elongated spots in the middle of the vertex, a similar one, but smaller, between the antennæ, and a somewhat rounded one on each side of the front in the genæ, black; labrum and palpi ferruginous. *Prothorax* very short, twice as broad as long, ferruginous (much depressed in the dead insect). *Meso-* and *metathorax* yellowish ferruginous, the sutures darker. *Wings* elongate, rounded at the apex; hyaline, some of the cellules having a sort of whitish oxydization in the middle; pterostigma long, yellowish-ferruginous: *anterior wings* with all the costal veinlets, the gradate veinlets, those between the radius and its sector, and all those in the basal half of the wing black, the longitudinal veins and the rest of the veinlets and apical furcations pale yellowish; the veins, veinlets and margins slightly hairy; cubital cell subquadrate; 15 costal veinlets, 10 between the radius and its sector, 5 in the inner gradate series, 4 in the outer, about 6 of the veinlets on the dorsal portion of the apical margin simply furcate, the rest of the marginal veinlets simple: *posterior wings* with the costal veinlets and those between the radius and its sector black, the rest almost all yellowish. *Legs* yellow, the tarsi ferruginous, the claws long, dilated at the base. *Abdomen* ochreous, slightly hairy.

CHRYSOPA NIGRICEPS, n. sp. Albida. Antennæ alis multo longiores, albæ, articulis duobus basalibus nigris. Caput, et thorax supra, nigricanta, infra albida. Alæ anticæ latæ, obtusæ, macula magna basali punctoque ad sectoris initium, nigris, plaga magna ante apicem, punctis striaque marginem dorsalem versus fuliginosis; venis venulisque albis, in signatis nigris, pubescentibus: posticæ dimidio angustiores; macula magna costali ante apicem, punctoque marginis dorsalis medium versus, fuliginosis; venis venulisque ut in anticis. Pedes albi. Abdomen albidum, linea dorsali nigra. Long. corp. 5'''; exp. alar. 1'' 4'''.

Hab. Ega, Brasilia (*Bates*). In collect. auctoris.

Antennæ much longer than the wings, whitish, the two basal joints black. *Head* and *thorax* deep blackish fuscous above, whitish beneath; *eyes* black; *labrum* whitish; *palpi* whitish, annulated with fuscous: *prothorax* much broader than long, the anterior angles oblique. *Wings* hyaline: *anterior wings* rather broad, obtuse; a dark blackish blotch occupies the extreme base, a small black dot at the point where the sector parts from the radius; a large irregular smoky fuscous blotch on the costa before the apex, and some dots and an irregular streak along the external series of gradate veinlets; veins and veinlets everywhere white, excepting where they traverse the dark markings, when they are black; marginal cilia rather long; the veins and veinlets with long but distant hairs: *posterior wings* nearly one half narrower than the anterior, more acute, veins and veinlets similar; a smoky fuscous spot on the costa before the apex, and a dot towards the dorsal margin about the middle. *Legs* white, the posterior tarsi slightly testaceous; claws long, slightly dilated at the base, testaceous. *Abdomen* whitish, rather thickly clothed with short silky pubescence; a blackish dorsal line, becoming broader towards the apex.

CHRYSOPA PALLICEPS, n. sp. Pallide viridi-flava. Antennæ alis fere duplo longiores, griseo-albidæ, articulis duobus basalibus piceo-nigris. Caput pallide viridi-flavum; fronte nitente nigra; palpis albidis, nigro annulatis. Prothorax fere quadratus, supra pallide viridi-flavus, infra albus. Mesothorax metathoraxque supra piceo-nigri, infra albi. Alæ hyalinæ: anticæ obtusæ; plaga ante costæ apicem magna, fenestrata, fusca; venis venulisque albidis, nonnullis ad basin, gradatis, illisque in plaga fuscis: posticæ fere dimidio angustiores, acutæ, plaga magna ante costæ apicem fusca; venis venulisque albidis, in plaga fuscis. Pedes albi. Abdomen pallide viridi-flavum, linea dorsali apicali nigra. Long. corp. 3'''; exp. alar. 1''.

Hab. Ega, Brasilia (*Bates*). In collect. auctoris.

Antennæ very slender, almost twice the length of the wings, pale greyish white; the two basal joints pitchy black. *Head* with the vertex pale greenish-yellow; face shining black; *eyes* black; *palpi* whitish, annulated with black. *Prothorax* nearly quadrate, above pale greenish yellow, beneath whitish. *Meso-* and *metathorax* above pitchy black, beneath whitish. *Wings* hyaline, the margins and neuration strongly ciliated: *anterior wings* with a large fuscous blotch on the costa before the apex, enclosing three or four pale cellules below the radius; a fuscous clouding at the extreme base; veins and veinlets whitish, the two first costal veinlets, those in the clouding at the extreme base of the wing, two or three about the commencement of the sector, the gradate series, and those in the fuscous blotch dark blackish fuscous: *posterior wings* about one-half narrower than the anterior, acute; a large fuscous spot on the costa before the apex; veins and veinlets whitish, some of the costal, the gradate series, and those in the costal spot, blackish. *Legs* white, ciliated; the tips of the tarsi obscure.

This species is closely allied to *C. nigriceps*; both are extremely beautiful and delicate insects, and allied to *C. elegans*, Guérin, belonging to a group apparently peculiarly Brazilian.

B. *Labro antice emarginato.*

CHRYSOPA GIGANTEA, n. sp. Olivaceo-grisea. Antennæ alis breviores, nigræ, articulis duobus basalibus griseis. Palpi labrumque rufo-brunnei. Prothorax brevis, vix longior quam latior; utrinque lineis duabus parvis nigris. Alæ hyalinæ, vix albido tinctæ; spatio pterostigmatico olivaceo-griseo, elongato; venis longitudinalibus albidis nigro interruptis; venulis transversalibus costalibus, gradatis, postcostalibus nonnullisque incrassatis ad basin omnino nigris, reliquis plerumque nigro terminatis; venis venulisque breviter nigro hirsutis. Pedes pallide grisei; tibiis basi nitente nigro annulatis; unguiculis rufo-testaceis, basi dilatatis. (♀). Long. corp. 1″; exp. alar. 2″ 3‴.

Hab. Natalia. In collect. auctoris.

Antennæ shorter than the wings, thick, deep black, with the two basal joints pale grey. *Head* small, pale olivaceous grey; the eyes (in death) concolorous; labrum and palpi shining reddish brown. *Prothorax* scarcely as long as broad, slightly notched on each side in front and with the anterior angles acute; pale olivaceous grey, the anterior angles slightly reddish, two short black lines on each side. *Meso-* and *metathorax* olivaceous grey varied with yellow in the middle. *Wings* elongate, whitish hyaline; pterostigmatical space elongate, olivaceous, the longitudinal veins whitish, with strong black interruptions; the whole of the costal veinlets (excepting those towards the apex), the veinlets in the subcostal space, the gradate series, and four or five very strong ones at and below the cubital cells totally black, those between the radius and its sector, and those between the cubitus anticus and posticus, black at each end, the marginal forks blackish at their bases, the rest of the veinlets whitish; all the veins and veinlets with short black hairs, each hair springing from a black point; the costa grey, with a blackish line at the junction with the thorax: *anterior wings* with about 24 costal veinlets; the transverse veinlet at the base of the subcostal space placed level with the fifth costal one, about 7 veinlets at the apical end of this space; 4 cellules in the postcostal area. *Legs* pale grey; all the tibiæ with a shining black ring at their junction with the femora; claws shining reddish brown, dilated at their bases. *Abdomen* very robust, dilated and laterally compressed; yellowish grey, the ventral sutures yellow, the sides grey.

Of this magnificent insect I possess one female from Natal.

CHRYSOPA RUFOSTIGMA, n. sp. Pallide flava, fusco varia. Antennæ alis paulo breviores, nigræ, articulo basali aurantiaco. Caput aurantiacum, vertice macula semicirculari fuscescente; palpi aurantiaci; labrum vix emarginatum. Prothorax dimidio et ultra latior quam longior, antice rotundatus, pallide flavus, utrinque piceo-brunneo signatus, medio profunde longitudinaliter sulcatus. Mesothorax pallide flavus, antice et utrinque postice nitens niger, punctis nonnullis mediis nigris. Metathorax pallide flavus, postice et utrinque niger. Alæ angustæ, elongatæ, acutæ, albido-hyalinæ; pterostigmate elongato, rufo: anticæ costa vix excisa; punctis tribus basalibus, venulis costalibus basin versus in parte basali nonnullisque pone medium nigris, venarum venularumque cæteris pallide flavo-albidis: posticæ venulis nonnullis pone medium nigris, cæteris ut in anticis. Pedes flavi; femoribus intermediis et posterioribus annulo ante apicem lineaque intus fuscis; unguiculis basi paulo dilatatis. Abdomen piceo-brunneum, supra flavo varium. (♀) Long. corp. 6‴; exp. alar. 1″ 1‴.

Hab. Natalia. In collect. auctoris.

Antennæ rather shorter than the wings, black, the basal joint orange. *Head* orange; the vertex yellowish behind, in the middle with a horseshoe-shaped fuscescent mark; front slightly obscure in the middle anteriorly; labrum and palpi orange-coloured, the former very slightly emarginate. *Prothorax* more than half as broad as long, rounded in front, with a deep longitudinal groove in the middle; pale yellow, with a curved fuscous streak on each side, and a spot of the same colour at the anterior angles. *Mesothorax* pale yellow, a large elongate transverse spot on the anterior margin, a large rounded spot on each side posteriorly, and several smaller spots in the middle shining black. *Metathorax* pale yellow, posteriorly and on each side black. The underside of the meso- and metathorax with dark brown markings. *Wings* long and narrow, acute, whitish hyaline; pterostigma 2½‴ long, reddish: *anterior wings* with the costal margin very slightly excised in the middle; three small black spots at the base towards the dorsal margin; the first six costal veinlets at their bases, the postcostal veinlets and a few above them, the sector for a space in its middle, and the base of the veinlets to the radius, starting from this space, the last seven gradate veinlets of the inner series, and the veinlets between these and the outer series black, all the other veins and veinlets pale whitish yellow, all clothed with very short hairs; about 25 costal veinlets, 17 between the radius and its sector, about 12 in the outer gradate series, 11 in the inner; these two series are scarcely parallel, being more approximate towards the base; the transverse veinlet at the base of the subcostal space placed about level with the fourth costal veinlet: *posterior wings* with a space in the middle of the sector, the base of the veins running from that space to the radius, and the inner gradate series black, the others pale whitish yellow. *Legs* yellow, a ring before the apex of the intermediate and posterior femora, and a line on the inner side of these brown; tarsi darker, claws slightly dilated at the base. *Abdomen* pitchy brown, the margins of the segments above and at the sides yellowish; the penultimate ventral segment very long, forming a shining reddish-brown plate; the antepenultimate ventral segment also long, with an elongated depression on its lower edge.

Allied to *C. æqualis*, Walker.

CHRYSOPA CLARA, n. sp. Griseo-ochracea. Antennæ alis valde longiores, flavo-albidæ, articulo basali supra sanguineo tincto. Caput vertice antice linea angulata nigra; clypei vitta transversa sanguinea; Prothorax elongatus, antice angustatus, linea media impressus; puncto utrinque fusco. Alæ latæ, albido-hyalinæ; pterostigmate flavo, intus fusco notato: anticæ venis venulisque flavo-albidis, longe hirsutis; radio ad basin puncto nigro; venulis costalibus ad initium, nonnullis ad basin inter radium et sectorem, furcula postcostali serieque gradata externa nigris; cellula ad furcam postcostæ fuliginosa: posticæ angustiores, venis venulisque omnino flavo-albidis. Abdomen flavum; dimidio apicali nigro punctato. Pedes flavo-albidi. Long. corp. 6½‴: anten. 1″ 7‴; exp. alar. 1″ 10‴.

Hab. Ega, Brasilia (*Bates*). In collect. auctoris.

Antennæ nearly twice the length of the wings, yellowish white, the basal joint marked with pinkish above. *Head* greyish ochreous; *vertex* flattened, a fine angular black line in the anterior portion behind the basal joints of the antennæ; *front* with a pinkish spot immediately below the basal joints of the antennæ, clypeus with a broad transverse pinkish band; *palpi* yellowish; *eyes* lead-coloured. *Prothorax* with the length twice the breadth, much narrowed in front, above with a deep median impressed longitudinal line; greyish ochreous, paler beneath, a fuscous spot on each side placed more on the under surface than on the upper. *Meso-* and *metathorax* greyish ochreous, the lobes prominent. *Wings* broad, the apical margin rounded, but the extreme apex slightly acute; whitish hyaline; pterostigma yellow, with a fuscous mark internally: *anterior wings* with the veins and veinlets very pale yellowish white and, with the margins, longly pubescent; a black spot at the extreme base of the radius at its junction with the mesothorax; middle costal veinlets black at their commencement on the margin, the first wholly black; the commencement of the sector, and the four first veinlets between it and the radius, almost wholly black; several veinlets below the commencement of the radius and the whole of the outer gradate series, and several in continuation between the branches of the cubitus, wholly black; postcostal furcation and the veinlet beyond it black, *the cellule between fuliginous*; gradate series scarcely parallel; marginal veinlets simply forked; pterostigmatical veinlets numerous: *posterior wings* with all the veins and veinlets pale. *Legs* pale yellowish white, pubescent. *Abdomen* yellow, the apical half with black spots.

This beautiful insect is very closely allied to *C. varia*, Schneider, but differs especially in a somewhat different arrangement of the black veinlets, and in the fuliginous cellule at the end of the postcosta; it is also larger.

MANTISPIDÆ.

Genus TRICHOSCELIA, *Westwood.*

TRICHOSCELIA LATIFASCIA, n. sp. Flavo-ochracea. Antennæ, caput, prothoracis dimidium antice et abdominis apex nigra; prothoracis dimidium postice, mesothorax, metathorax et abdominis dimidium basale flavo-ochracea. Alæ nitentes albo-hyalinæ; anticæ maculis duabus oppositis ante medium nigro-fuscis; fascia lata subapicali fusca; venis venulisque flavis, nonnullis ad basin nigris: posticæ parvæ; margine costali ad basin pterostigmateque nigro-fuscis; macula ad basin marginis dorsalis fusca. Pedes flavo-ochracei; antici trochanteribus, femoribusque infra, nigro signatis; postici femoribus nigris. Long. corp. $4\frac{1}{2}'''$; exp. alar. antic. $10\frac{1}{2}'''$; post. $7'''$.

Hab. Ega, Brasilia (*Bates*). In collect. auctoris.

Antennæ and *head* black; the joints of the former are transverse and triangular, hairy, almost spinous. *Eyes* grey. *Prothorax* with the length more than twice the breadth; anterior half black, posterior half yellowish ochreous. *Meso-* and *metathorax* broader than the head with the eyes, yellowish-ochreous. *Abdomen* with the basal half yellowish ochreous, the apical half black; apex obtuse, with two minute, curved, and distant testaceous spine-like appendices. *Wings* whitish hyaline, very shining: *anterior wings* with two large blackish fuscous opposite spots before the middle, one on the costal margin, the other on the dorsal margin; a very broad transverse fuscous fascia before the apex, leaving only a small hyaline apical space; veins and veinlets yellow, those in the dark markings, and the base of the subcosta, radius, and cubitus black; about 13 costal veinlets before the pterostigma, pterostigmatical veinlets very numerous, about 9 gradate veinlets, and one or two further in towards the dorsal margin, veinlets on the dorsal margin simply furcate, those on the apical margin for the most part twice forked; all the veins and veinlets finely hairy: *posterior wings* one-third shorter than the anterior, and much narrower; pterostigma blackish fuscous; a fuscous spot on the dorsal margin towards the base; veins and veinlets black, excepting the middle portion of the costa and subcosta, which are yellow; 6 gradate veinlets. *Legs* yellow, the dilated portion of the anterior femora largely marked with black beneath, the teeth black, the trochanters black; intermediate pair with the base of the femora black; posterior pair with the base of the femora and the tarsi (wholly, except the extreme base) black.

PANORPIDÆ.

Genus PANORPA, *Linné*.

The following is a synopsis of the species known to occur in Japan:—

1. PANORPA JAPONICA, *Thunberg, Nov. Ins. Sp. Dissert.* iii. pl. 67. f. 9. Nigra. Alæ albido-hyalinæ; fasciis duabus perlatis, quarum una pone medium (ad costam intus aliquando furcata). altera apicalis, nigris. Pedes rufescentes. Abdomen cylindricum; ♂ segmentis 1°–4^{m} transversis; 5° elongato; 6° quinto fere æquali, vix tenuiore, margine posteriore truncato, lateribus paulo productis; 7° quam 6^{m} longiore, tenuiore, gradatim incrassato, margine posteriore oblique truncato; 8° brevi, transverso, obconico, forcipe perelongata, rufo-fusca, ad basin intus fimbriata; appendicibus brevibus, parvis. ♂. Long. corp. 12‴; exp. alar. 1″ 7‴.

♂. *Body* totally deep shining black. *Wings* whitish hyaline, a little obscure towards the base; with two very broad black fasciæ, one beyond the middle, the other occupying the apex, the first fascia is sometimes slightly furcate internally on the costa, or there is at this place a small detached spot; pterostigma scarcely coloured; all the veins and veinlets black; the subcosta joins the costa slightly beyond the middle, far before the pterostigma. *Legs* reddish, the tarsi more obscure; claws with 4 or 5 long teeth below the apex. *Abdomen* long, cylindrical, the first four segments transverse; 5th long; 6th about as long as the 5th, and slightly narrower, the apical margin truncated, with the sides slightly produced; 7th longer than the 6th, thin, but gradually incrassated, the apical margin obliquely truncated; 8th transverse, broad, obconical, the forceps very long, fringed internally at the base, reddish brown; appendices very short and small.

I have not a perfect specimen of the ♀.

There can be no doubt that this is the insect intended by Thunberg.

2. PANORPA KLUGII, *mihi.* Piceo-brunnea; rostro pedibusque plus minus rufo-testaceis. Alæ testaceo-hyalinæ; fasciis duabus, quarum

una angusta pone medium, altera lata apicalis, maculisque ante fasciam primam nigro-fuscis. Abdomen gracile; ♂ segmentorum 1^i–4^i marginibus lateralibus vix alatis; 2^o supra in medio paulo producto; 6^o cylindrico, elongato, truncato; 7^o quam 6^m longiore, graciliore, oblique truncato; 8^o elongato-conico, forcipe elongata, intus ad basin fimbriata; appendicibus linearibus, parvis. ♀ prothorace pectoreque rufis. Long. corp. ♂ 9‴, ♀ 6‴; exp. alar. ♂ 1″ 3‴, ♀ 1″ 1‴.

♂. The whole of the body excepting the rostrum, pitchy-brown; *rostrum* reddish. *Legs* reddish fuscous; claws with three teeth internally below the apex. *Wings* hyaline, with a decided testaceous tinge; with two blackish fuscous fasciæ,—one narrow, beyond the middle; the other broad, occupying the apex; before the first fascia are one or two detached fuscous spots (sometimes absent); veins blackish fuscous at the base, somewhat testaceous between the fasciæ; the subcosta joins the costa in the middle. *Abdomen* slender, moderately long; the first four segments transverse, the lateral margins slightly winged; 2nd segment with its posterior margin slightly produced in the middle above; 5th subcylindrical, long, truncated; 6th about the length of the 5th, and thinner, truncated, the lateral margins slightly angular; 7th longer than the 6th, gradually incrassated, obliquely truncated; 8th forming an elongated cone, the forceps very long, and fringed internally at the base; the appendices are linear and small. ♀ differs only in having the prothorax and the whole of the breast reddish; the legs redder. *Abdomen* compressed, short.

This may be *P. japonica*, of Klug, 'Abhandl. Akad. Berlin,' 1836; but his description would seem to indicate a species in which the first fascia is broad, and more closely allied to the true *japonica* of Thunberg.

3. PANORPA MACROGASTER, n. sp. ♂. Nigra. Alæ albido-hyalinæ, fasciis duabus latis, quarum una pone medium, altera apicalis, nigro-fuscis, albido longitudinaliter striatis; punctis nonnullis ante fasciam primam et inter fascias, nigro fuscis; venis piceo-nigris, inter fascias testaceis. Pedes rufi. Abdomen valde elongatum, robustum, segmentorum 1^i–4^i marginibus lateralibus paulo alatis; segmento 2^o supra postice in medio producto; 6^o cylindrico, quam 5^m paulo angustiore, postice truncato, utrinque in dentem producto; 7^o quam 6^m valde angustiore, longiore, gradatim incrassato; 8^o brevi, obconico, forcipe rufa, perelongata. Long. corp. 14‴; exp. alar. 1″ 8‴.

♀. Minor. Abdomen gracile, dimidio basali alato; segmentis gradatim angustioribus. Long. corp. $6\frac{1}{2}$‴; exp. alar. 14‴.

♂. *Antennæ, head, rostrum, palpi,* and *the whole of the body* black; the membranous portion between the abdominal segments reddish. *Wings* whitish hyaline; with two broad blackish fuscous fasciæ, one beyond the middle, the other occupying the apex, these fasciæ are traversed longitudinally by lines of the whitish ground-colour in the middle between the veins, the dark colouring consisting of a broad margining of the longitudinal veins, and in the apical fascia there are several similarly margined transverse vienlets, hence this fascia has a fenestrated appearance; before the first fascia are two or more fuscous spots, sometimes uniting and forming a more or less complete basal fascia; between the fasciæ there is generally a fuscous spot on the dorsal margin, which sometimes unites with the first fascia, and forms a little fork; pterostigma yellow; basal veins black, most of those between the fasciæ more or less testaceous; the subcosta joins the costa scarcely beyond the middle, far before the pterostigma. *Legs* rufous; claws with three obtuse teeth below the apex. *Abdomen* very long and robust; the first four segments more or less transverse, the lateral margins winged; second segment with its posterior margin above produced in the middle; 5th segment nearly cylindrical, longer than broad, scarcely narrower than the fourth; 6th cylindrical, about as long as the 5th, and narrower, truncated at the apex, the apical margin produced at each side into a tooth; 7th longer than the 6th and very much thinner, cylindrical, gradually thickened towards the apex, which is truncated, with the margins slightly concave above and beneath; 8th short, broadly obconical, the forceps very long, the points crossing each other, reddish brown.

♀. Much smaller than the ♂. In the specimen before me the basal spots on the anterior wings form a fascia. *Abdomen* slender, the apical segments very thin; basal segments laterally winged, as in the male; two last segments equal, together not so long as the antepenultimate.

It is remarkable that in the neuration of all the three above-described species, the subcosta joins the costa at, or scarcely beyond, the middle, a peculiarity which, in the European species, is seen only in *P. variabilis*.

4. PANORPA, sp. nov. "*Mit ganz schwarzen weiss gefleckten Flügeln.*" Coll. Hagen. Vide *Stett. ent. Zeit.* 1867, p. 90.

5. PANORPA LEUCOPTERA, *Uhler, Proc. Acad. Scien. Philadelphia,* 1858. Alæ albæ, punctis nigris conspersæ.

I have seen a female of this; the male is yet unknown.

A revision of the "*List of the specimens of Neuropterous Insects in the collection of the British Museum. Part II.*, 1853. By F. WALKER," as far as the end of the genus *Myrmeleon*, pp. 193–410.

In making this revision I have examined all the examples indicated as being in the collection at the time of the publication of the list, both those described as new, and those referred to previously named species; but I have paid no regard to examples acquired since the publication and placed under the various labels.

Family SIALIDÆ.

Genus SIALIS, p. 194.

SIALIS LUTARIUS, p. 194, 1; all the specimens=*S. lutaria*, L.

S. INFUMATUS, p. 195, 2; all=*S. infumata*, Newm.

S. FERRUGINEUS, p. 195, 3=*S. americana*, Rambur.

Genus ITHONE, p. 197.

ITHONE FUSCA, p. 196, 1=*I. fusca*, Newm. This genus belongs to the *Hemerobiidæ*.

Genus MEROPE, p. 196.

MEROPE TUBER, p. 196, 1=*M. tuber*, Newm. This genus belong to the *Panorpidæ*.

Genus CHAULIODES.

CHAULIODES PECTINICORNIS, p. 198, 1=*C. pectinicornis*, L.

C. RASTRICORNIS, p. 198, 2=*C. rastricornis*, Ramb.

C. SINENSIS, p. 199, 3=*C. sinensis*, Walker.

C. CALIFORNICUS, p. 199, 4=*C. californicus*, Walker.

C. SIMPLEX, p. 200, 5=*C. simplex*, Walker.

C. SUBFASCIATUS, p. 200, 7=*C. subfasciatus*, Walker.

C. FASCIATUS, p. 201, 8.

I have no doubt that these examples are American, and that the locality "New Holland" is erroneous. According to the foliated antennæ of the ♂ they should=*C. lunatus*, Hag. (Proc. Ent. Soc. Philadel. vol. ii. p. 180; *C. serricornis*, Hag., Neurop. of N. Amer. p. 190), and not the true *serricornis*.

Genus HERMES, p. 201.

This genus, which equals *Neuromus* of Rambur, is made up of species of *Chauliodes* and *Corydalis*.

HERMES MACULATUS, p. 202, 1; probably=*Chauliodes serricornis*, Say, but some of them may be *lunatus*.

H. RUFICOLLIS, p. 202, 2=*Chauliodes maculipennis*, Gray. I know not for what reason Gray's name is deposed in favour of *ruficollis*, Rambur, to which it is long anterior.

H. MACULIFERA, p. 203, 3=*C. maculipennis*, Gray, ♀.

H. SINENSIS, p. 203, 4=*Chauliodes sinensis*, Walker. As this name is already employed in *Chauliodes*, I propose to change it to *Bowringi*.

H. GUTTIFERUS, p. 204, 5=*Chauliodes guttiferus*, Walker. No locality is given, but examples have been since received from Australia.

H. DUBITATUS, p. 204, 6=*Chauliodes californicus*, Walker, ♀.

H. INDECISUS, p. 204, 7=*Chauliodes rastricornis*, Rambur, ♀.

H. ANTICUS, p. 205, 8=*Chauliodes sinensis*, Walker, ♀.

H. DIVERSUS, p. 205, 9=*Chauliodes diversus*, Walker.

H. PRASINUS, p. 206, 10. I cannot imagine what fatality induced Mr. Walker to place this insect (described as *Chloroperla prasina* by Newman) among the *Sialidæ*, with which it has nothing in common. It is somewhat allied to *Eusthenia* of Westwood; and I recently proposed for it the generic term *Stenoperla*; *vide* 'Trans. Ent. Soc.' ser. 3. vol. v. p. 354.

H. TESTACEUS, p. 206, 11=*Corydalis testacea*, Rambur.

H. HIEROGLYPHICUS, p. 206, 12=*Corydalis hieroglyphica*, Rambur. This and *testaceus* are very closely allied, although coming from such opposite localities.

H. ALBIPENNIS, p. 206, 13=*Corydalis albipennis*, Walker.

H. COSTALIS, p. 207, 14=*Corydalis costalis*, Walker. This species is ill-placed in *Corydalis*, and does not agree well with *Chauliodes*, on account of the numerous transverse veinlets. It seems to vary much in the markings, probably according to the degree of maturity attained by the individuals. The, as yet, not rediscovered *Hemerobius grandis*, of Thunberg, from Japan, should be somewhat allied.

Genus CORYDALIS, p. 208.

C. CORNUTA, p. 208, 1. The example from Columbia=*C. armata*, Hagen (*cornuta*, Rambur); the two other specimens are the true *cornuta*.

Genus RAPHIDIA, p. 209.

I leave the exact determination of the species of this genus for a future occasion, when I shall have worked them out for my 'Monograph of the British *Planipennia*.' The species are very closely allied, but can be separated with certainty by means of the anal parts of both sexes.

R. VARIA, p. 212, 13, belongs to the *Mantispidæ*, and=*Trichoscelia varia*, Walker*. I was once present in the British Museum when a recently received nest of *Myrapetra scutellaris*, from Monte Video, was opened, and saw therein numerous living examples of *T. varia*, in all its stages. It is probable that all the species of *Trichoscelia* have similar parasitic habits.

Family HEMEROBIIDÆ.

Genus MANTISPA, p. 213.

M. SEMIHYALINA, p. 214, 1=*M. semihyalina*, Serville. I possess examples from Obajos on the Amazons, which differ in having the dilated anterior femora wholly blackish, the other legs somewhat testaceous.

M. BRUNNEA, p. 214, 2=*M. brunnea*, Say.

M. VARIA, p. 214, 3=*M. varia*, Erichs. This is very closely allied to *brunnea*, but probably distinct; the lower edge of the anterior darker portion of the wing runs straight from base to apex, and is not carried downwards to the apical portion of the dorsal margin as in *brunnea*.

M. DECORATA, p. 215, 6=*M. decorata*, Erichs.

M. PROLIXA, p. 215, 7=*M.* ——?; not *prolixa*, Erichs.

M. PUSILLA, p. 216, 10=*M. pusilla*, Pallas. The "var." from the East Indies (Ceylon) is different, and allied to *Cora* and *rufescens*.

M. PAGANA, p. 217, 11=*M. styriaca*, Poda.

M. PERLA, p. 217, 12=*M.* ——?; the example is of doubtful origin, and, I think, distinct from *perla*; the anterior femora scarcely thicker than the coxæ, and almost cylindrical.

M. TENELLA, p. 218, 16=*M. tenella*, Erichs.

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* Since the above was written, Prof. Westwood has published descriptions of many new species of *Mantispidæ* (*vide* Trans. Ent. Soc. Lond. ser. 3, vol. v. pp. 501–508). Among them is a species named *Mantispa myrapetrella* (p. 505), which he says cannot possibly be the same as *R. varia* of Walker. Nevertheless the two names are undoubtedly synonymous; but, setting aside the vexed question as to the right of insufficient or erroneous descriptions to carry priority, it is desirable that Westwood's name should be retained, as a *Mantispa varia* previously existed. I cannot understand why Westwood should retain *myrapetrella* in *Mantispa* proper, rather than in *Trichoscelia*, which he still calls only a subgenus. The most important structural difference in the two genera (for I consider *Trichoscelia* undoubtedly a *genus*) consists in the form of the prosternum; and *myrapetrella* has that of *Trichoscelia*, and not the solid structure seen in *Mantispa* proper.

M. RUFESCENS, p. 220, 24=*M. rufescens*, Erichs.

M. CORA, p. 221, 28=*M. Cora*, Newman. The Malabar example is the type specimen; the other is not different.

M. AUSTRALASIÆ, p. 223, 33, for the most part *M. australasiæ*, Guérin; but one example from Van Diemen's Land is *M. vittata*, Guérin, and another from "New Holland," without any special indication of locality, is perhaps an undescribed species.

M. DELICATULA, p. 224, 36=*M. delicatula*, Westwood.

M. DISCOLOR, p. 224, 37=*M. discolor*, Westwood; the type specimen.

M. BISERIATA, p. 225, 38=*M. biseriata*, Westwood; the type specimen. This species differs so greatly from the normal form of *Mantispa* that I propose for it the generic term *Ditaxis*, which may be thus briefly diagnosed:—

DITAXIS *, n. g.

Mantispæ similis; sed alis latioribus, valde obtusis; costa a subcosta apicis tenus distante; area costali latiore; venularum gradatarum seriebus duabus.

M. 4-TUBERCULATA, p. 225, 39=*M. 4-tuberculata*, Westwood.

M. LINEOLATA, p. 226, 43=*M. lineolata*, Westwood; the type specimen.

M. INDICA, p. 226, 44=*M. indica*, Westwood; a type specimen.

M. FENELLA, p. 227, 46=*Trichoscelia fenella*, Westwood; the type specimen.

M. VIRIDIS, p. 227, 47=*M. viridis*, Walker. This is evidently allied to *viridula*, Erichson, but, I think, distinct.

Genus HOPLOPHORA, p. 228.

This belongs to the *Mantidæ* (Orthoptera).

Genus NYMPHES, p. 229.

N. MYRMELEONIDES, p. 230, 1=*N. myrmeleonides*, Leach.

N. EXTRANEUS, p. 230, 2=*Myiodactylus* (?) *extraneus*, Walker. My previous assertion ('Journal of Entomology,' vol. ii. p. 111), that this insect possesses ocelli, was incorrect: the vertex has little prominences which have much the appearance of ocelli, but, on closer examination, I can discover nothing to indicate that they are more than blind tubercles. The plantulæ are double as in *Nymphes* and *Myiodactylus*; yet the antennæ are those of *Osmylus*. I retain it doubtfully in *Myiodactylus* for the present. It is Australian, and the ♀ possesses ventral valves and a borer analogous to those described lower down under *Stenosmylus stenopterus.*

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* I have since received a paper by Brauer ("Beitrag zur Kenntniss der Mantispiden-Gattungen," Verhandl. d. k.-k. zool.-bot. Gesellschaft in Wien, 1867, pp. 281–286), in which he places *M. biseriata* in the genus *Drepanicus* of Blanchard. This Chilian genus is quite unknown to me, save by description; and I feel rather doubtful if our Australian insect will fall into it satisfactorily, and therefore, for the present, retain my proposed generic term *Ditaxis*.

N. SEJUNCTUS, p. 230, 3=*Myiodactylus sejunctus,* Walker. Here I again erred in referring this to *Osmylus*; it is a true *Myiodactylus,* but of a form different from that *M. osmyloides,* the typical species, and in outward appearance is more like a *Chrysopa.* The following description is drawn up from a male in my collection from Northern Australia:—

MYIODACTYLUS SEJUNCTUS, *Walker.* Viridi-flavus. Antennæ flavæ, apicem versus subvirescentes. Caput flavum, vertice linea media impressa rufescente; mandibulæ nigræ. Oculi plumbacei. Prothorax longior quam latior, antice angustior, viridi-flavus, longe flavescenti-hirsutus; antice macula media lanceolata piceo-brunnea. Mesothorax metathoraxque brunneo-flavi, ille antice fovea media piceo-brunnea. Alæ elongatæ, angustatæ, hyalinæ, costa fere recta, area costali angusta, pterostigmate vix obscuriore; anticæ venis longitudinalibus pallide viridibus, venulis transversalibus nigris (costalibus in parte pallidis): posticæ venis venulisque fere omnino pallide viridibus; costalibus ad apices, pterostigmaticalibus omnino, nigris. Pedes virescentes. Abdomen flavum, utrinque nigro punctatum; appendicibus analibus magnis, superioribus in digitulos furcatos productis, inferioribus processu cylindrico fere hyalino, viridi terminato, instructis. (♂.) Long. corp. 6‴; exp. alar. 1″ 9‴.

Hab. in Australia boreali et occidentali. In collect. auct. et Mus. Brit.

Antennæ not half the length of the wings, thickened beyond the middle, yellow, somewhat greenish towards the apex, slightly hairy. *Head* yellow, the crown with a narrow impressed longitudinal median brownish line; mandibles blackish. *Eyes* lead-colour. *Prothorax* about twice as long as broad, narrowed in front, hairy, yellow, with a lanceolate pitchy brown spot in the middle of the anterior portion, and a vestige of a spot on the posterior margin. *Meso-* and *metathorax* much broader than the prothorax, yellow, the former with a pitchy brown fovea in the middle of the anterior median lobe. *Wings* elongate, narrow, subacute, the costal margin nearly straight, and the costal area narrowed; hyaline, the pterostigmatical region rather obscured, all the veins and veinlets finely hairy, the costal margins minutely nigro-punctate: *anterior wings* with all the longitudinal veins (excepting the last on the dorsal margin) pale greenish; transverse veins and marginal veinlets black, those in the costal area with a greenish interruption towards their bases; costal veinlets before the pterostigma for the most part simple, apical marginal veinlets mostly simply furcate: *posterior wings* narrower than the anterior; all the veins and veinlets greenish, the apical marginal furcations, the base of the costal veinlets, the apex of those between the radius and its sector, and those in the pterostigmatical region black. *Legs* greyish with a greenish tinge, pilose, the claws tipped with brown. *Abdomen* yellow, obscurely spotted with blackish at the sides, slender, the terminal segment bearing large appendices. From the superior surface of the last segment proceeds a broad yellow plate thickly clothed with strong yellow hairs; this plate is somewhat bent under, and from each lateral margin proceeds a finger-shaped greenish yellow appendice, which is deeply furcate, the branches widely divaricating, and with a small tubercle or tooth in the base of the fork; the ventral segment is also produced into a large plate, on each side of which is a nearly straight cylindrical process directed upwards, nearly transparent, but green at the apex, which is deeply divided, so that it appears to end in two sharp brownish teeth; the ventral plate bears in the middle an elongate, rectangular, truncated, cover-like piece, placed in the cavity between the dorsal and ventral plates and united to the latter.

M. osmyloides, Brauer, the typical species, is distinguished by its very broad wings, rounded costa, and broad costal and marginal areas. *M. sejunctus* agrees with it in all important characters, save the shape of the wings, which is only specific. I may remark that the example of *osmyloides* in my collection bears the locality-label "China;" but this is probably an error, which is additionally likely, considering that I have two species from Australia.

Although *Myiodactylus* differs in many important characters from that noble insect *Nymphes myrmeleonides*, yet the filiform antennæ, and the absence of ocelli, seem fully to justify Brauer in placing it with that insect in the family *Nymphidæ*, instituted by Leach for the reception of *N. myrmeleonides*, which in its nerval characters nearly approaches the *Myrmeleonidæ*.

Another species of *Myiodactylus* I describe as under:—

MYIODACTYLUS ARMATUS, n. sp. Viridi-flavus. Antennæ pallide flavæ, viridi terminatæ. Caput flavum; vertice corrugato, postice elevato. Palpi fuliginoso cingulati. Oculi plumbacei. Prothorax longior quam latior, antice vix angustior, postice spatio magno concavo linea elevata longitudinali instructus; flavus, utrinque lineis obscure fuscis. Alæ elongatæ, subangustatæ, acutæ, anticarum costa vix arcuata; hyalinæ, pterostigmate albido: anticæ macula parva radii basi nigra, venis longitudinalibus albidis, venulis transversalibus furcisque marginalibus fere omnino nigris: posticæ venis venulisque plerumque pallidis, harum costalibus, subcostalibus, multis apicem versus dimidioque furcularum nigris. Pedes albidi. Abdomen flavo-fuscum (colores mutati); venter ante apicem unguiculis duobus elongatis armatus. (♀.) Long. corp. 7‴; exp. alar. 1″ 11‴.

Hab. in Australia boreali. In collect. auct.

Antennæ not more than half the length of the wings, thickened beyond the middle, very pale yellow, the apical portion greenish, slightly hairy. *Head* yellow, the vertex corrugated in the middle and elevated posteriorly, a slightly raised flattened plate at the base of each antenna; front with a slightly raised flat transverse space below the antennæ, beyond this space irregularly corrugated; palpi with broad fuliginous rings. *Prothorax* about twice as long as broad, scarcely narrower in front, the sides nearly parallel, yellow, with obscure lateral fuscous lines; the anterior margin rounded; at about a third of its length anteriorly is a transverse impression; the hinder portion bears a large concave space the edges of which are raised, the anterior edge being strongly rounded, and divided in the middle by a raised longitudinal line. *Meso-* and *metathorax* yellow with a greenish tinge, unspotted, but with several impressed lines and spaces. *Wings* elongate, acute, the costa of the anterior very slightly rounded; hyaline, the pterostigma whitish; *anterior wings* with all the longitudinal veins whitish, almost all the transverse veinlets and marginal forks black, in the subcostal area are several transverse veinlets, those towards the base starting from the subcosta but not reaching the radius, and hence appearing as black dots; a small black spot at the base of the radius: *posterior wings* with the greater part of the veins and veinlets pale, the costal veinlets, many towards the apex, and the apical furcations (for the most part only in their basal half) black. The margins and all the veins and veinlets are strongly hairy in all the wings. *Legs* whitish, hairy, the tarsi somewhat obscure, and the claws brownish. *Abdomen* yellowish fuscous (the colours altered) slender, dilated and laterally compressed at the apex, clothed with fine hairs, the apex obtuse and fringed with long hairs; the seventh abdominal segment beneath is furnished with an extraordinary appendage, consisting of a strong tubercle from the lower edge of which proceed two long bent and incurvated needle-shaped claws reaching nearly to the extremity of the abdomen.

I possess one example, which I have little doubt is a female, from Northern Australia; the wings are broader and more acute than in *sejunctus*, and the prothorax is differently formed.

Genus OSMYLUS, p. 231.

O. CHRYSOPS, p. 232, 1=*O. maculatus*, F. I adopt the Fabrician name, because the Linnean description of *Hemerobius chrysops* cannot apply to this insect, although in his collection it bears the label "*chrysops*" in his own handwriting. Unfortunately this collection passed through so many hands before it reached its final resting-place, that too great reliance should not be placed on the labels when the insects do not agree with the descriptions.

O. STRIGATUS, p. 233, 2=*O. strigatus*, Burm. This will not generically agree with *Osmylus*, as was pointed out by Burmeister. Recently Hagen ('Hemerobiidarum Synopsis Synonymica') has briefly diagnosed a new genus for its reception, but without name. I propose that of *Porismus*, which may be thus characterized:—

PORISMUS, n. g.

Antennæ moniliformes, alis breviores. Caput parvum, fronte elongato-triangulari. Palpi maxillaris articulis incrassatis. Ocelli tres, approximati. Prothorax elongatus, duplo longior quam latior, antice gradatim angustior. Alæ latæ, apicibus rotundatis: anticæ spatio costali basi dilatato, venulis costalibus transversalibus pernumerosis; subcosta cum radio conjuncta, venulis transversalibus in spatio subcostali numerosis; sectore primo cæteros emittens, ab radio distante sed ad apicem approximato; venis longitudinalibus 5^a et 6^a parallelis, curvatis; venulis transversalibus pernumerosis. Pedes graciles, hirsuti; tarsi articulo primo cæteris longiore; unguiculi simplices; pulvilli magni. Abdomen gracile.

It differs from *Osmylus*, *inter alia*, by its longer and more slender prothorax, and especially in the neuration. In *Osmylus* the first sector runs parallel with the radius, and is separated from it by a small space, whereas in *Porismus* it is distant, excepting at the apex; in *Osmylus* there is only one transverse veinlet, placed at the base of the subcostal area; in *Porismus* there are numerous veinlets, along the whole length of that area; the direction of the 5th and 6th longitudinal veins is also different, and the network generally much closer.

P. strigatus appears to be very common in Australia, judging from the numerous examples I have seen.

O. VALIDUS, p. 233, 3=*Polystœchotes punctatus*, F. teste Hagen, who states that he has seen the type described by Fabricius in Banks's Museum. I have been unable to find this type. It is singular that Fabricius should, a few years later, have again described an insect so little variable under another name (*Hemerobius nebulosus*).

O. TENUIS, p. 233, 4. For this insect I propose the generic term *Stenosmylus*; the genus should probably be placed between *Myiodactylus* and *Osmylus*; it possesses the ocelli and antennæ of the latter, but the form of the plantulæ approaches that of the former; the general form is remarkably narrow.

STENOSMYLUS, n. g.

Antennæ moniliformes, alis breviores. Labrum emarginatum. Palpi parvi. Ocelli tres. Prothorax elongatus, subcylindricus. Pedes graciles; plantulæ bifidæ. Alæ elongatæ, angustæ, ad apicem subrotundatæ, aut acutæ; subcosta cum radio conjuncta; sector primus radio parallelus, cæteros emittens; spatium subcostale venula transversali una basali; venulæ subcostales numerosæ; venulæ transversales in disco pernumerosæ.

1. STENOSMYLUS TENUIS, *Walker*.

2. STENOSMYLUS STENOPTERUS, n. sp. Flavo-fuscus. Antennæ pallide flavæ. Caput flavum, vertice fusco quadrivittato, fronte fusco varia. Prothorax flavo-fuscus, nigricante vittatus. Alæ perangustæ, elongatæ, acutæ: anticæ albo-hyalinæ, maculis costalibus apicem versus strigaque longitudinali in dimidio apicali marginem dorsalem versus fuscis; venis longitudinalibus fusco longitudinaliter striatis, albo interruptis; venulis transversalibus albis, nigro tuberculatis, posticæ hyalinæ, pterostigmate brunneo, venis longitudinalibus fuscis, venulis pterostigmaticalibus marginalibusque nigro tuberculatis. Pedes flavi, pilosi; tibiarum et tarsorum articulorum apicibus nigricantibus. Abdomen fuscum; apice incrassato, terebra compressa, sursum incurvata, instructo; infra ante apicem valvulis duabus bifidis instructum. (♀.) Long. corp. 5‴–6‴; exp. alar. 15‴–20‴.

Hab. in Australia. In Mus. Brit.

Yellowish fuscous. *Antennæ* shorter than the wings, pale yellow, hairy. *Head* yellow; vertex with four fuscous longitudinal stripes; face with fuscous markings; palpi fuscescent; ocelli black. *Prothorax* with the length more than twice the breadth, slightly narrowed anteriorly, hairy at the sides; yellowish fuscous, with longitudinal blackish streaks in the middle and at the sides. *Mesothorax* yellowish fuscous, striped with black. *Wings* very narrow, elongate, acute: *anterior wings* whitish hyaline; a fuscous streak from the apex reaches nearly halfway to the base near the dorsal margin; some fuscous spots on the terminal portion of the costal margin; longitudinal veins with long fuscous streaks interrupted by shorter white spaces; costal and marginal veinlets whitish, with numerous thickened black dots; discal veinlets for the most part half black and half white, each with one or two thickened blackish dots in the middle: *posterior wings* hyaline, iridescent; pterostigma brownish, pterostigmatical and marginal veinlets with numerous thickened black dots; longitudinal veins and discal veinlets fuscous, the latter showing a trace of the thickened dots. *Legs* yellow; the tips of the tibiæ and of the tarsal joints blackish fuscous, the terminal tarsal joint wholly fuscous. *Abdomen* fuscous, the apex incrassated and testaceous; at the base of the 6th ventral

segment a large valve, on each side of which is a long straight spine dilated towards the apex; at the apex of the 7th ventral segment a deeply bifid semitransparent valve, the produced points of which are directed towards the base and opposed to the spines on the other valve; between these valves is a deeply concave space; the clavate or thickened portion of the terminal segment is provided with a long sabre-shaped flattened yellow borer, curved upwards.

Three examples, varying much in size, in the collection of the British Museum.

3. STENOSMYLUS (?) LONGIPENNIS, *Walker*, vide infra.

O. CONSPERSUS, p. 234, 5=*Osmylus conspersus*, Walker. A true *Osmylus*.

O. LONGIPENNIS, p. 235, 6. I place this provisionally in *Stenosmylus*; but it is aberrant, and will probably eventually form a new genus.

O. TUBERCULATUS, p. 235, 7=*Osmylus tuberculatus*, Walker. Probably a true *Osmylus*.

O. LONGICORNIS, p. 235, 8. This is a very aberrant insect, and, from its setaceous antennæ, it should perhaps be placed in the *Chrysopidæ*. Hagen (Neurop. N. America, p. 210) places it provisionally in the uncertain genus *Meleoma*, for want of further information. The type is in bad condition, and I postpone further details on its structure.

Genus CHRYSOPA, p. 236.

C. VITTATA, p. 237, 1. Under this label are two or three small species very distant from the true *vittata*; the example from Malaga may be *C. microcephala*.

C. CONGRUA, p. 238, 2=*C. congrua*, Walker. Allied to *C. vulgaris*, L., but differs in its narrower and more pointed wings, more open neuration, and shorter pubescence.

C. REMOTA, p. 238, 3=*C. remota*, Walker. The examples from the different localities present no appreciable differences.

C. OCEANICA, p. 238, 4=*C. oceanica*, Walker. Very closely allied to *remota*, but apparently distinct.

C. BASALIS, p. 239, 5=*C. basalis*, Walker.

C. CONCOLOR, p. 239, 6=*C. congrua*, Walker.

C. VULGARIS, p. 239, 7. The one with the label "*vulgaris*" is a much damaged and almost destroyed specimen, apparently *C. alba*; the others are *vulgaris* and *alba*.

C. INVARIA, p. 241, 11=*C. invaria*, Walker.

C. DIVISA, p. 242, 13=*C. collaris*, Schneider.

C. ATTENUATA, p. 242, 14=*C. attenuata*, Walker.

C. THORACICA, p. 243, 15=*C. thoracica*, Walker. The example shows no trace of the rufous streak on each side of the antennæ mentioned by Hagen in 'Neurop. N. America.'

C. ALBA, p. 243, 16=*C. alba*, L.

C. REPLETA, p. 244, 17=*C. repleta*, Walker.

C. HYBRIDA, p. 245, 20=*C.* ——? Not *hybrida* of Schneider.

C. 4-PUNCTATA, p. 246, 22, is wanting, nor is there any pin-hole to indicate that it has ever been there.

C. INFECTA, p. 246, 23=*C. infecta*, Newm. Labro antice paulo emarginato; belongs to another section.

C. CINCTA, p. 247, 24=*C. cincta*, Schnd.

C. NIGRICOSTATA, p. 250, 34, wanting.

C. 7-PUNCTATA, p. 251, 36=*C. 7-punctata*, Wesm.

C. INTERMEDIA, p. 252, 40=*C. intermedia*, Schnd. (from Santarem). The one without locality is different.

C. INTERNATA, p. 252, 41. This equals *C. ampla*, p. 268, 72; and, as the examples of *C. internata* are placed in a wrong section, I think the name *ampla* should be retained.

C. NIGROVARIA, p. 253, 42=*C. nigrovaria*, Walker. The "var. β" is a very different species.

C. RAMBURII, p. 254, 43=*C. Ramburii*, Schnd.

C. SIGNATA, p. 254, 44. The example from Van Diemen's Land=*C. Ramburii*; the other is different, but not *signata* of Schneider.

C. INNOTATA, p. 254, 45=*C. innotata*, Walker. Antennar. artic. secund. fuliginoso.

C. TRANSVERSA, p. 255, 46=*C. collaris*, Schneider, var.?; appears to differ only in the altogether black costal veinlets.

C. ASPERSA, p. 256, 48=*C. aspersa*, Wesm.

C. ABBREVIATA, p. 257, 51=*C.* ——? Certainly not *abbreviata*, but more closely allied to *Zelleri*; the example is perhaps not European.

C. LATIPENNIS, p. 257, 54=*C. ypsilon*, Fitch.

C. CHLOROPHANA, p. 259, 55=*C. transmarina*, Hagen, *teste* Hagen. There are probably two species intermixed; but it belongs to a group in which the differences seem to depend so much upon the presence or absence of one or other of the complicated markings of the head, and are perhaps only accidental, that I decline to give any positive opinion on the examples mentioned by Mr. Walker.

The following citation is omitted in Hagen's 'Hemerob. Synop. synonymica:'—*C. illinoiensis*, Shimer, Proc. Ent. Soc. Philadelphia, vol. iv. p. 208 (January 1865), from Illinois.

C. OCCULTA, p. 260, 56= *C. ypsilon,* Fitch.

C. PERLA, p. 262, 60=*C. perla,* L.

C. CAPITATA, p. 264, 63=*C. capitata,* F.

C. FULVICEPS, p. 265, 64=*C. fulviceps,* Steph.

C. ÆQUALIS, p. 266, 67=*C. æqualis,* Walker.

C. STIGMATICA, p. 267, 69=*C. stigmatica,* Rambur.

C. INSIGNIS, p. 267, 70=*C. insignis,* Walker.

C. VARIA, p. 268, 71= *C. varia,* Schnd.

C. AMPLA, p. 268, 72= *C. ampla,* Walker. Closely allied to *C. varia.*

C. INSULARIS, p. 269, 73= *C. insularis,* Walker. Also allied to *C. varia*, but smaller.

C. CONFORMIS, p. 269, 74= *C. conformis,* Walker.

C. ANTICA, p. 270, 76=*C. antica,* Walker. Allied to *C. pallens* of Rambur, and *C. guadarramensis* of Ed. Pictet.

C. DIVERSA, p. 271, 77=*C. diversa,* Walker.

C. MARIONELLA, p. 271, 78=*Apochrysa Marionella,* Guérin.

C. AURIFERA, p. 272, 79=*Apochrysa aurifera,* Walker.

C. LUTEA, p. 273, 80=*Apochrysa lutea,* Walker.

Genus HEMEROBIUS, p. 276.

H. VIRIDIPENNIS, p. 276, 1=*Rapisma viridipennis,* Walker. In my description of the genus *Rapisma* (Trans. Ent. Soc. ser. 3, vol. v. p. 353) I have *incorrectly* stated that there is no recurrent venule at the base of the costal area; there is such a venule, but it is not conspicuous.

H. PHALÆNOIDES, p. 277, 2=*Drepanepteryx phalænoides,* L.

H. BINOCULUS, p. 278, 3=*Drepanepteryx binoculus,* Newm. This, with *D. instabilis,* M'Lach., and *D. humilis,* M'Lach., is closely allied to *phalænoides,* notwithstanding its distant locality. The presence of a very short transverse veinlet near the end of the subcostal area makes it deceptively appear as if the subcosta and radius became suddenly confluent; a similar veinlet is sometimes found in *D. phalænoides.*

H. FLAVICORNIS, p. 278, 4=*Berotha flavicornis,* Walker.

H. HAMATUS, p. 278, 5=*Berotha hamatus,* Walker.

H. MIMICUS, p. 279, 6=*Psychopsis mimica,* Newm. It is probable that *P. elegans,* Guérin (*Arteriopteryx elegans,* Guérin, 'Icon. p. 389), is distinct from *P. mimica*, though evidently very closely allied. I have an example which agrees exactly with Guérin's description, and which I had originally placed as possibly a sexual form or variety of *P. mimica*.

H. cœlivagus, p. 279, 7 = *Psychopsis cœlivagus*, Walker.

H. hirtus, p. 280, 8 = *Megalomus hirtus*, L.

H. longicollis, p. 281, 12 = *Berotha longicollis*, Walker.

H. subanticus, p. 282, 13 = *Micromus subanticus*, Walker.

H. obscurus, p. 282, 14 = *H. humuli*, L.

H. posticus, p. 283, 15 = *Micromus posticus*, Walker. ♂. Abdominis segmento ultimo ventrali in laminam latam obtusam producto, appendicibus spiniformibus.

This is probably the same as *M. insipidus*, Hagen. I possess four examples from New York.

H. fuscus, p. 283, 16 = *H. subnebulosus*, Steph.; *vide* remarks to *H. nervosus*, infra.

H. subnebulosus, p. 284, 17 = *H. subnebulosus*, Steph.

H. pallidus, p. 284, 18 = *H. micans*, Oliv.

H. pellucidus, p. 284, 19 = *Hemerobius pellucidus*, Dale.

H. nervosus, p. 285, 20. The specimen from Children's collection = *H. humuli*, L.

Under the name of *H. nervosus*, two European species are confounded; they considerably resemble each other, save in the anal appendices, which are strikingly dissimilar. I reserve details for my work on the British *Hemerobiidæ*, but in the meantime diagnose the special characters as under:—

H. nervosus, Fab. et auct. Appendices anales fere regulariter curvatæ. *Hab.* in Europa continent. vulgatissimus, in Anglia aliquanto rarus.

I have seen but few British examples. It is probably the species intended by all continental authors. For the other I use the name

H. subnebulosus, Stephens. Appendices anales elongatæ, latæ, rectæ; apicibus truncatis, dilatatis, infra spina elongata, curvata, ad apicem extus unidentata instructis.

Hab. in Anglia vulgatissimus.

I have not seen a continental example of this, nor is it known as such by Dr. Hagen.

The types of *subnebulosus* (in part), *humuli*, *fuscus*, and *nervosus* of Stephens's "Illustrations" are this species, which is exceedingly abundant in Britain, and very variable.

H. NEBULOSUS, p. 285, 21 = *H. limbatus*, Wesm.

H. SIMULANS, p. 285, 22 = *H. simulans*, Walker.

H. MARGINATUS, p. 286, 23. The Nova-Scotian example is a female; it does not appear to differ from the European *H. marginatus*, Steph. (*flexuosus*, Hag.).

H. HUMULI, p. 286, 24. The English example = *H. humuli*, L. I am not sure if the American insect be distinct; in general appearance it is precisely like the European, but may perhaps differ in the appendices; I possess several examples from New York.

H. PERELEGANS, p. 287, 25. Both examples are in Stephens's collection, and = *H. limbatus*, Wesm., dark vars.

H. LUTESCENS, p. 287, 26. The British example = *H. humuli*, L.; the one from Children's collection is very different, and doubtful, being in bad condition.

H. AFFINIS, p. 287, 27 = *H. humuli*, L.

H. PAGANUS, p. 287, 28 = *H. humuli*, L.

H. APICALIS, p. 288, 29 = *H. humuli*, L.

H. PUNCTATUS, p. 288, 30 = *H. micans*, Oliv.

H. CRISPUS, p. 288, 31 = *H. limbatus*, Wesm. The American examples do not essentially differ from the European, and have similar appendices.

H. STIGMA, p. 288, 32 = *H. limbatus*, Wesm.

H. MARSHAMI, p. 289, 34 = *H. elegans*, Steph. (*pygmæus*, Rambur).

H. OBLITERATUS, 289, 35. The specimen immature; apparently the same as *crispus* (*limbatus*).

H. AUSTRALIS, p. 289, 36 = *H. australis*, Walker. Closely allied to *humuli*.

H. VARIEGATUS, p. 290, 37 = *Micromus variegatus*, F.

H. CONCINNUS, p. 290, 38 = *H. concinnus*, Steph. (*lutescens*, F.; *cylindripes*, Wesm.).

H. PINI, p. 291, 39 = *H. limbatus*, Wesm.

H. LONGIFRONS, p. 291, 40 = *H. longifrons*, Walker. This is a remarkable insect, with the facies of *H. nervosus*, but with broader and more obtuse wings, and very distinct. In my European collection I have three examples, received from Prof. Zeller, which do not appear to be different from the American: the latter has four sectors, and my European insect, as a rule, only three; but one specimen has three in one fore wing, and four in the other; the legs are entirely pale in the American, but sometimes varied with fuscous in the European. All the individuals are females, which sex is remarkable for the possession of a broad elongated flattened borer at the apex of the abdomen, indicating some peculiar habit. I subjoin a more correct and detailed description:—

HEMEROBIUS LONGIFRONS, *Walker*. Nigro-fuscus, vitta dorsali ferrugineo-fusca. Antennæ flavæ, apice obscuriore. Frons nitente piceo-nigra. Alæ latæ, obtusæ: anticæ albido-hyalinæ, fuliginoso nebulosæ; fasciis transversis tribus nigro-fuscis; venis venulisque albis, confertim nigro punctatis striatisque; venulis gradatis externe 7–8 valde irregularibus, interne 6–7, et ad basin 4, omnino nigris; sectoribus 3 vel 4: posticæ hyalinæ, venis venulisque nigris. Pedes pallide flavi; in exemp. Europ. tibiis aliquando inconspicue fusco notatis, femoribus posterioribus in parte fuscis. Abdomen nigro-fuscum, terebra lata, elongata, depressa, acutiuscula instructum. (♀.) Long. corp. 3–4‴; exp. alar. 9–10‴.

Hab. in Hudson's Bay, America boreali (*Barnston*); Europa (Spitzberg, Silesia, Bameralp, Steyermark) (*Zeller*) 4 ♀.

H. FASCIATUS, p. 291, 41 = *H. limbatus*, Wesm. In Stephens's coll.

H. FUSCATUS, p. 296, 60 = *Sisyra fuscata*, F.

H. NITIDULUS, p. 296, 61 = *Sisyra Dalii*, M'Lach.

H. CONFINIS, p. 297, 62 = *Sisyra fuscata*, F.

H. VICARIUS, p. 397, 65 = *Sisyra vicaria*, Walker.

Note.—The genus *Dromophila*, inserted at p. 298, belongs to the Trichoptera; and *D. montana* = *Enoicyla pusilla*, Burmeister, ♀.

Genus CONIORTES, p. 208.

All the examples noted by Walker are in Stephens's collection, and the nomenclature is that of the 'Illustrations' of that author. *Coniortes*, Westwood = *Coniopteryx*, Haliday.

Family MYRMELEONIDÆ.

Genus MYRMELEON, p. 300.

In my examination of the enormous number of species under this head (ninety-eight are described as new by Mr. Walker), I have endeavoured to fix them in the limits of the generic synopsis given by Hagen in his 'Hemerobiidarum Synopsis Synonymica.' Walker places them in sections; but the species in many instances do not accord with his subdivisions. It will be necessary that at some future time an extensive splitting up of some of Hagen's genera shall be made. *Palpares* is for the most part very homogeneous; yet *P. gigas* and its allies seem to form a genus apart, and I have in this paper (*ante*, p. 243) proposed a generic term for *P. hæmatogaster*. *Stenares* forms a natural group. *Pamexis* is also natural; yet *M. pardalinus* of Walker might be placed either here or in *Palpares*. *Tomateres* is to a certain extent made up of nearly allied forms, but their relationship to *Palpares* is close. *Dimares* is very natural. *Stilbopteryx* differs widely from any other group. *Acanthaclisis* is made up of species with a particular facies, yet contains well-marked groups, *A. horridus* and *A. fallax* being especially aberrant. The words in Hagen's diagnosis, "calcaribus fractis" only hold good for a portion of the species; in the rest the spurs are regularly curved. *Glenurus* is especially heterogeneous, and stands greatly in need of redivision: the Australian species, and especially *G. erythrocephalus*, have little in common with the others. *Creagris* is apparently natural. *Gymnocnemia* comprises very few species, which readily fall into one genus. *Mecistopus* should probably be only retained for the typical species; the South American *M. efferus* and *M. prædator* are aberrant. *Formicaleo* is tolerably natural, but should perhaps include some species placed in *Glenurus*. *Myrmecælurus* should be retained for *M. trigrammus* and its near allies, which alone possess the character "abdomen maris ante apicem penicillatum;" the other species are aberrant. *Macronemurus* seems to be natural. *Myrmeleon*, if regarded as a group distinguished by the spurs not exceeding the first tarsal joint, is tolerably homogeneous, yet it contains discordant materials when viewed from other points.

The number of species of *Myrmeleon*, in the old sense, will probably be eventually found to exceed 500; and it is evident that in such a mass very many generic forms must exist. It remains for a monographer to sift this mass; until then I fear that a natural classification of the *Myrmeleonidæ* cannot be looked for, and we must be content to improve upon the generic groundwork laid down by Hagen.

M. GIGAS, p. 301, 1 = *Palpares gigas*, Dalm.

M. CONTRARIUS, p. 301, 2 = *Palpares contrarius*, Walker.

M. SOLLICITUS, p. 302, 3 = *Palpares cephalotes*, Klug, ♀. This insect was taken during the exploring voyage of the 'Blonde;' but no locality is mentioned. Hagen (Stett. Ent. Zeit. 1860, pp. 360–361) thinks it may be from the Society Islands. This I conceive to be impossible, and consider it African or Arabian. The specimen agrees perfectly with Klug's figures (Symb. Phys.) of his *cephalotes*.

M. INCLEMENS, p. 303, 4=*Palpares inclemens,* Walker, ♀.

M. CEPHALOTES, p. 304, 5. This is probably the *cephalotes* of Rambur; but I doubt much if it be identical with Klug's species; only males are in the collection, and there is a possibility that *P. inclemens* may be the female of it.

M. FURFURACEUS, p. 305, 6. The same as those under *cephalotes,* but slightly differing in the markings.

M. PATIENS, p. 305, 7=*Palpares patiens,* Walker.

M. LIBELLULOIDES, p. 305, 8=*Palpares libelluloides,* L. One of the specimens from Tunis is *P. hispanus,* Hagen.

M. SPECIOSUS, p. 306, 9. For the most part *Palpares speciosus,* L.; but four examples are *P. caffer,* Burm.

M. TIGRIS, p. 307, 10=, I think, certainly *Palpares manicatus* of Rambur, and very probably the true *tigris* of Dalman.

M. INFIMUS, p. 307, 11=*Palpares infimus,* Walker.

M. PARDUS p. 308, 12=*Palpares pardus,* Rambur.

M. SUBDUCENS, p. 308, 13=*Palpares cephalotes,* Klug. This insect is from the voyage of the 'Blonde,' and differs only very slightly in markings from that described as *sollicitus.*

M. INCOMMODUS, p. 309, 14=*Palpares incommodus,* Walker.

M. ZEBRATUS, p. 310, 15. According to Hagen (Stett. Ent. Zeit. 1860) this is not the same as *zebratus* of Rambur: the description of the latter seems to me to agree with Walker's insect, excepting some slight variation in the markings of the posterior wings.

M. EXPERTUS, p. 311, 16=*Palpares pardus,* Rambur.

M. PARDALINUS, p. 314, 26. This I think cannot be the same as *M. pardalinus* of Burmeister, which seems to me to be a *Pamexis,* closely allied to *conspurcatus.* Walker's insect has the form of *Pamexis,* but wants the pulverulent appearance of those insects. I call it provisionally *Palpares? brachypterus.*

M. OCCITANICUS, p. 315, 28=*Acanthaclisis occitanica,* Vill. Calcaribus abrupte inflexis; area costali biareolata.

M. DISTINCTUS, p. 316, 30, var.? According to Hagen not the species of Rambur. Calcaribus abrupte inflexis; area costali uniareolata.

M. EDAX, p. 317, 32. According to Hagen=*gulo,* Burm.; the specimens have been in alcohol, and are much altered in the coloration of the body. Calcaribus abrupte inflexis; area costali uniareolata.

M. LONGICOLLIS, var.?, p. 318, 34. Not Rambur's species. Calcaribus abrupte inflexis; area costali biareolata.

M. FUNDATUS, p. 320, 36=*Acanthaclisis fundata*, Walker. Calcaribus regulariter curvatis; area costali biareolata.

M. SUBTENDENS, p. 321, 37=*Acanthaclisis subtendens*, Walker. Calcaribus regulariter curvatis; area costali biareolata.

M. MOLESTUS, p. 322, 38. The same as *Acanthaclisis distincta*, Walker.

M. FERALIS, p. 322, 39=*Acanthaclisis feralis*, Walker. Calcaribus abrupte inflexis; area costali uniareolata.

M. FERUS, p. 323, 40=*Acanthaclisis atra*, Fab., teste exemp. typ. in collect. Banks. Calcaribus regulariter curvatis; area costali uniareolata.

M. IMPOSTOR, p. 324, 41=*Acanthaclisis fallax*, Ramb. Calcaribus regulariter curvatis; alis latioribus, area costali plerumque biareolata, venulis irregularibus.

M. PERITUS, p. 325, 42=*Stenares hyæna*, Dalman.

M. IMPROBUS, p. 326, 43=*Stenares improbus*, Walker.

M. INCLUSUS, p. 327, 44=*Acanthaclisis inclusa*, Walker. Calcaribus regulariter curvatis; alis latioribus, area costali plerumque biareolata, venulis irregularibus.

M. LONGICAUDUS, p. 329, 46=*Macronemurus abdominalis*, Say. There appears to be some confusion about this species and the next. In Hagen's 'Neurop. N. Amer.' p. 226, *abdominalis* is said to have "no spurs;" in his 'Hemerob. Synop. Synonym.' it is placed in *Macronemurus*, to which genus Walker's species undoubtedly belongs; and *longicaudus* of Burmeister is placed in *Myrmeleon*, in its limited sense. I believe that Hagen possesses Burmeister's type, and I cannot unravel the perplexity.

M. CONSPERSUS, 329, 47=*Macronemurus irroratus*, Rambur. In the 'Neurop. N. Amer.' both *irroratus* and *conspersus* are given as synonyms of *abdominalis*.

M. NEBULOSUS, p. 330, 48=*Macronemurus nebulosus*, Rambur?

M. INIQUUS, p. 330, 49=*Macronemurus iniquus*, Walker.

M. IMMITIS, p. 331, 50=*Macronemurus immitis*, Walker.

M. VERSUTUS, p. 331, 51=*Macronemurus versutus*, Walker.

M. FEROX, p. 332, 52=*Macronemurus ferox*, Walker.

M. ANOMALUS, p. 333, 54=*Glenurus anomalus*, Rambur. Walker queries the determination; but the insect seems to agree perfectly with Rambur's description.

M. TETRAGRAMMICUS, p. 335, 59=*Formicaleo tetragrammicus*, Pall.

M. HORRIDUS, p. 336, 61=*Acanthaclisis horridus*, Walker. Calcaribus valde curvatis; alis latis; area costali uniareolata. This is a very abnormal species of the genus.

M. PERICULOSUS, p. 337, 62=*Myrmeleon periculosus*, Walker. Calcaribus artic. tar. 1^1 æqualibus.

M. INGENIOSUS, 337, 63=*Formicaleo ingeniosus*, Walker.

M. AUDAX, p. 338, 64=*Formicaleo audax*, Walker.

M. GRAVIS, p. 339, 65=*Formicaleo gravis*, Walker.

M. STRIOLA, p. 340, 66=*Formicaleo striola*, Leach. A species very widely distributed; I possess it from the Fiji Islands. It is probable that *M. bistrigatus*, Rambur, is only a strongly marked form, and that Rambur's name should be retained, that of Leach being only in M.S.; the description is by Walker.

M. PERJURUS, p. 340, 67=*Formicaleo striola*, Leach.

M. TORVUS, p. 341, 68. Not to be separated from *F. striola*, and identical therewith; the wings seem slightly narrower.

M. VERENDUS, p. 342, 69=*Formicaleo verendus*, Walker.

M. VESANUS, p. 343, 70=*Formicaleo vesanus*, Walker.

M. MINAX, p. 343, 71=*Formicaleo verendus*, Walker.

M. PUGNAX, p. 344, 72=*Formicaleo pugnax*, Walker. Perhaps=*M. mustelinum*, F.

M. VAFER, p. 345, 73=*Formicaleo vafer*, Walker.

M. DIRUS, p. 346, 74=*Formicaleo dirus*, Walker.

M. LENTUS, p. 346, 75=*Formicaleo dirus*, Walker.

M. TRUCULENTUS, p. 347, 76=*Formicaleo truculentus*, Walker.

M. VIOLENTUS, p. 348, 77=*Formicaleo striola*, Leach. A variety without the dark line in the apex of the posterior wings: one example of *perjurus* (*vide supra*) shows only a slight trace of this line.

M. ACER, p. 348, 78=*Myrmeleon acer*, Walker.

M. CAUTUS, p. 349, 79=*Formicaleo cautus*, Walker.

M. DURUS, p. 350, 80=*Formicaleo durus*, Walker. The example has been in spirits, and its original form is not recognizable.

M. PERFIDUS, p. 350, 81=*Creagris perfidus*, Walker. Closely allied to the European *C. plumbeus*.

M. INSIDIOSUS, p. 350, 82=*Macronemurus appendiculatus*, Lat.

M. V-NIGRUM? p. 351, 84. This closely agrees with Rambur's description of his European *v-nigrum*, but can scarcely be the same species. It is identical with *Creagris mortifer*, Walker.

M. PALLIDIPENNIS, p. 352, 85 = *Creagris plumbeus*, Oliv.

M. AFRICANUS, p. 352, 86 = *Creagris africanus*, Rambur. Scarcely distinct from *C. plumbeus*.

M. MORTIFER, p. 353, 88 = *Creagris mortifer*, Walker.

M. PERVIGIL, p. 354, 89 = *Creagris mortifer*, Walker.

M. SEDULUS, p. 355, 90 = *Creagris perfidus*, Walker.

M. LUGDUNIENSIS, p. 355, 91 = *Creagris plumbeus*, Oliv.

M. APPENDICULATUS, p. 356, 93 = *Macronemurus appendiculatus*, Lat.

M. INFESTUS, p. 357, 94 = *Glenurus infestus*, Walker.

M. NEFANDUS, p. 357, 95 = *Macronemurus nefandus*, Walker.

M. ADVERSUS, p. 358, 96 = *Creagris perfidus*, Walker.

M. BARBARUS, p. 358, 97 = *Macronemurus barbarus*, Walker.

M. DESPERATUS, p. 359, 98 = *Formicaleo vafer*, Walker.

M. PERNICIOSUS, p. 360, 99 = *Formicaleo vafer*, Walker.

M. ABDITUS, p. 360, 100 = *Macronemurus abditus*, Walker.

M. NIGROCINCTUS? p. 361, 101 = *Glenurus obsoletus*, Say. I believe the locality "Australia" to be an error.

M. TACITUS, p. 362, 102 = *Glenurus tacitus*, Walker.

M. FLAVUS, p. 363, 103 = *Myrmecœlurus trigrammus*, Pallas.

M. TAPPA, p. 364, 107 = *Formicaleo Tappa*, Walker. Perhaps the ♀ of *vesanus*; the tibiæ distinctly fasciated.

M. MALEFIDUS, p. 364, 108 = *Formicaleo vafer*, Walker.

M. INFIDUS, p. 365, 109 = *Myrmecœlurus infidus*, Walker.

M. ACERBUS, p. 366, 110 = *Myrmecœlurus acerbus*, Walker. Closely allied to *M. trigrammus*, differs in the subcosta being black, interrupted with yellow, the radius wholly black, and some of the other veins also black.

M. MENDAX, p. 366, 111 = *Myrmecœlurus mendax*, Walker.

M. SOLERS, p. 367, 112 = *Myrmecœlurus solers*, Walker.

M. FORMICARIUS, p. 368, 113 = *Myrmeleon formicarius*, L.

M. INOPINUS, p. 368, 114 = *Myrmeleon inopinus*, Walker.

M. LANCEOLATUS, p. 369, 115 = *Myrmeleon lanceolatus*, Rambur.

M. NOTATUS, p. 369, 116 = *Megistopus flavicornis*, Rossi.

M. INNOTATUS, p. 371, 123=*Myrmeleon formicalynx*, L. Teste exemp. typ. in collect. Linn.

M. INCONSPICUUS, p. 372, 125=*Myrmeleon Leachii*, Guilding.

M. LEACHII, p. 373, 127=*Myrmeleon Leachii*, Guilding.

M. TRISTIS, p. 373, 128=*Myrmeleon tristis*, Walker.

M. LETHALIS, p. 374, 129=*Myrmeleon lethalis*, Walker, *i. e.* the specimen bearing the label "*lethalis*;" the other two are very different and =*Formicaleo leucospilos*, Hagen.

M. LETHIFER, p. 374, 130=*Myrmeleon lethifer*, Walker.

M. SECRETUS, p. 375, 131=*Myrmeleon alternans*, Brullé. The specimen is smaller than examples of *alternans* taken by Wollaston in Madeira, and the markings of the head differ very slightly.

M. IMPLEXUS, p. 376, 132=*Myrmecœlurus implexus*, Walker.

M. EXITIALIS, p. 376, 133=*Myrmeleon exitialis*, Walker.

M. ACUTUS, p. 377, 134=*Myrmeleon acutus*, Walker.

M. TECTUS, p. 378, 135=*Myrmeleon tectus*, Walker. Doubtfully distinct from *M. immaculatus*, D. G., Hagen.

M. ASPER, p. 378, 136=*Myrmeleon asper*, Walker.

M. INVISUS, p. 379, 137=*Myrmeleon asper*, Walker.

M. MALIGNUS, p. 380, 138=*Myrmeleon malignus*, Walker.

M. FICTUS, p. 380, 139=*Myrmeleon malignus*, Walker.

M. IMMANIS, p. 381, 140=*Myrmeleon immanis*, Walker.

M. SÆVUS, p. 381, 141=*Myrmeleon sævus*, Walker. Closely allied to *M. punctatus*, F., teste exemp. typ. in coll. Banks, but with a differently shaped prothorax.

M. punctatus is said to inhabit "India orientalis;" but I know no species thence which will agree with Fabricius's type. It is well known that the localities in the old authors are rather uncertain; and I believe that *M. punctatus* comes from South Africa. I have an example from that quarter, which is specifically identical with the type.

The following is a description of it:—

MYRMELEON PUNCTATUS, *Fab.*

Flavus, nigro vittatus. Antennæ fuscæ, indistincte pallide annulatæ, articulo basali in fronte flavo semicincto; clava subtus ochracea. Caput flavum, inter antennas late nigrum; occipite vitta media punctisque quatuor nigris; fronte macula media piceo-nigra; palpis flavis, arti-

culo ultimo fere toto piceo-nigro, valde acuminato. Prothorax elongatus, antice angustior, flavus, supra nigro trivittatus. Mesothorax flavus; supra vitta media, duabusque lateralibus subinterruptis, nigris. Pectus flavum, utrinque nigro bivittatum. Alæ elongatæ, acutæ, fere æquales; pterostigmate fere quadrato, rufo-ochraceo; venis venulisque nigris, flavo-albido interruptis; punctis numerosis in furcularum axillis nigris. Pedes flavi; femoribus nigro punctatis; tibiis anticis intermediisque nigro fasciatis et punctatis; tarsis brunneo annulatis. Abdomen flavum; vittis quinque, quarum una dorsali, duabus utrinque, nigris. Long. corp. 1″ 3‴; exp. alar. 2″ 10‴.

M. SAGAX, p. 382, 142 = *Myrmeleon sagax*, Walker.

M. INFENSUS, p. 383, 143 = *Myrmeleon infensus*, Walker. Perhaps only a var. of *sævus*.

M. DOLOSUS, p. 383, 144 = *Myrmeleon dolosus*, Walker.

M. HOSTILIS, p. 384, 145 = *Myrmeleon hostilis*, Walker.

M. CALLIDUS, p. 384, 146 = *Macronemurus callidus*, Walker.

M. INSOMNIS, p. 385, 147 = *Formicaleo insomnis*, Walker.

M. OCCULTUS, p. 386, 148 = *Gymnocnemia occulta*, Walker.

M. METUENDUS, p. 387, 149 = *Myrmeleon metuendus*, Walker.

M. EFFERUS, p. 387, 150 = *Megistopus efferus*, Walker.

M. EXSANGUIS, p. 387, 151 = *Myrmeleon exsanguis*, Walker.

M. CRUDELIS, p. 388, 152 = *Myrmeleon crudelis*, Walker. Hagen ('Neurop. N. Amer.') queries his *rusticus* as identical with *crudelis*; his description of the former does not agree with Walker's species.

M. MOROSUS, p. 389, 153 = *Myrmeleon morosus*, Walker.

M. ATROX, p. 390, 154 = *Myrmecœlurus atrox*, Walker. Seems to be intermediate between *M. trigrammus* and *M. acerbus*.

M. INERS, p. 390, 155 = *Myrmecœlurus atrox*, Walker. Immature.

M. PRÆDATOR, p. 391, 156 = *Megistopus prædator*, Walker. Closely allied to *M. efferus* and doubtfully distinct.

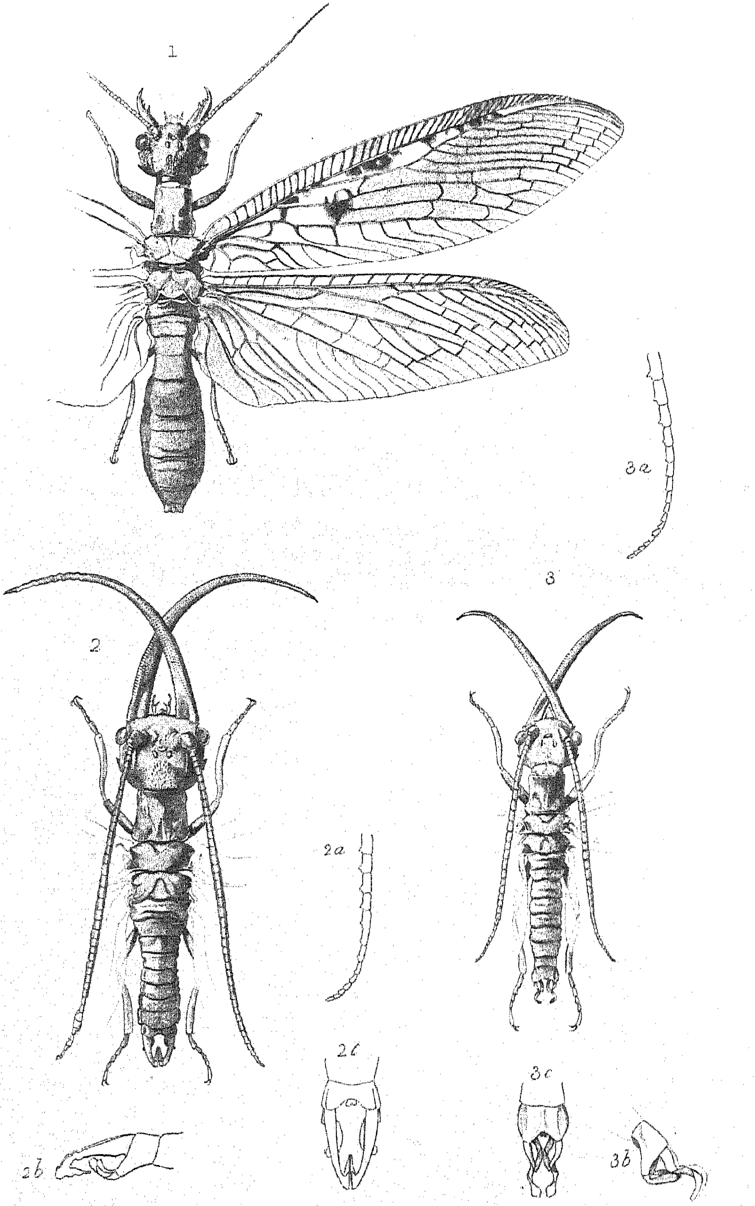
M. GRATUS, p. 392, 157 = *Glenurus gratus*, Say.

M. PULCHELLUS, p. 392, 158 = *Glenurus pulchellus*, Rambur.

M. FALSUS, p. 393, 159 = *Glenurus falsus*, Walker.

M. MALUS, p. 393, 160 = *Gymnocnemia mala*, Walker.

M. ERYTHROCEPHALUS, p. 394, 161 = *Glenurus? erythrocephalus*, Leach. This species comes very unsatisfactorily in *Glenurus*, which, in itself, contains several generic forms.



E. W. Robinson. Del et. Sc. 1867.

M. SUBDOLUS, p. 395, 164 = *Dimares subdolus*, Walker. Hagen ('Stett. ent. Zeit.' 1860) queries this asdistinct from *elegans* of Perty; but I believe the two species are thoroughly good. *M. conicollis* of Walker ('Trans. Ent. Soc. Lond.' ser. 2. vol. v. p. 188) is certainly *D. elegans*: this latter species is very liable to vary; for many specimens are entirely without the markings on the wings, and in these the normal dark reticulation is interrupted by pale spaces.

M. COMPOSITUS, p. 397, 166 = *Tomateres pardalis*, F. Teste exemp. typ. in collect. Banks.

M. ASTUTUS, 398, 167 = *Tomateres astutus*, Walker.

M. TRANSLATUS, p. 398, 168 = *Pamexis conspurcatus*, Burm.

M. SINGULARIS, p. 399, 170 = *Glenurus singularis*, Westw.

M. CIRCUITER, p. 400, 171 = *Glenurus circuiter*, Walker.

EXPLANATION OF PLATE VIII.

Fig. 1. *Corydalis Batesii*, ♀.
2. *Corydalis crassicornis*, ♂; 2 *a*, portion of antenna; 2 *b*, anal appendices (side view); 2 *c*, ditto (from above).
3. *Corydalis inamabilis*, ♂; 3 *a*, portion of antenna; 3 *b*, anal appendices (side view); 3 *c*, ditto (from above).

ERRATA.

Page 237, line 12 from top, *for* "apex" *read* "radius."
Page 253, line 13 from top, *dele* "dimidio et ultra."

On the Prevalence of Entozoa in the Dog, with Remarks on their Relation to Public Health. By T. S. COBBOLD, M.D., F.R.S., F.L.S., Lecturer on Zoology, &c.

[Read April 18, 1867.]

DESPITE the rapid advances of heminthological science, it is not yet sufficiently well understood how intimately connected are the relations subsisting between man and the domestic animals in reference to entozootic diseases. Whilst our very existence is dependent upon a supply of certain animals, as sources of food and aids to civilization, it can nevertheless be shown that under certain circumstances any one of the most valued of our domestic quadrupeds may become an occasion of discomfort, disease, or even death. The truth of this general statement is sufficiently obvious in cases of ordinary accident, and also in those diseases (hydrophobia for example), whose nature is either doubtful, or which, at the least, cannot be said to have a parasitic origin; but it comes out much more forcibly when we confine our attention exclusively to evils arising from entozoa harboured by our domesticated animals in their capacity as "intermediary bearers." In this communication I select the Dog as pointedly illustrating the correctness of the proposition just advanced; but, at the same time, I may add that, excepting perhaps the equine quadrupeds, I know of no important domestic animal which is not liable, by the agency of its parasites, to inflict on the human body one or other of the injuries just referred to—namely discomfort, disease, or death.

I may be permitted also to remark at the outset that all our researches, and especially those of the experimental kind, tend to show how the evils just mentioned may be averted; and many of our investigations having, in the first instance, a purely scientific object have materially strengthened the results obtained by other researches having merely a practical aim. It may be said that the two methods should go hand in hand, or, at least, *pari passu*, in order to ensure brilliant results. Already helminthologists have obtained a considerable success; but it is just one of those successes in which the principal promoters are left without reward. Self-imposed tasks of this kind are more or less the prerogative of all the votaries of science, who, at least, have the satisfaction of knowing that they contribute to the public good.

To simplify and limit the subject matter before us, I offer, at once, a complete and revised list of all the entozoa (species, varieties, and larvæ) at present known to infest the dog. In many respects it is interesting to contrast this, as a whole, with the rather more extended list of human entozoa which I have previously communicated to the Zoological Society; but, as will hereafter be seen, the mutual relations subsisting between certain members of the two series can only be established by a somewhat detailed notice respecting the individual forms. These are as follows:—

1. *Holostoma alatum*, Nitzsch.
2. *Spiroptera sanguinolenta*, Rudolphi.
3. *Dochmius trigonocephalus*, Dujardin.
4. *Trichosoma plica*, Rudolphi.
5. *Trichocephalus depressiusculus*, Rudolphi.
6. *Trichina spiralis*, Owen.

7. *Ascaris marginata*, Rudolphi.
8. *Eustrongylus gigas*, Diesing.
9. *Bothriocephalus latus*, Bremser.
10. *B. cordatus*, Leuckart.
11. *B. fuscus*, Krabbe.
    „ „ var. *reticulatus*, Krabbe.
    „ „ var. *dubius*, Krabbe.
12. *Tænia marginata*, Batsch.
13. *T. cœnurus*, Kuchenmeister.
14. *T. cucumerina*, Bloch.
15. *T. serrata*. Goeze.
16. *T. litterata*, Batsch.
17. *T. echinococcus*, Siebold.
18. *Pentastoma tænioides*, Rudolphi.
19. *Cysticercus (telæ) cellulosæ* } larval forms.
20. *Filaria trispinulosa* } larval forms.
21. *F. sanguinis* } larval forms.

The above list, large as it is, might be very much extended if one chose to regard as true species a number of particular forms and varieties described by authors under other names. I could show, however (if it were the express object of the present paper to do so), that most, if not all, of the forms referred to are in point of fact identical with those here provisionally admitted to be distinct. Probably the list is somewhat too extended as it is; yet, meanwhile, I purposely refrain from entering at any length upon the exclusively zoological aspects of the question. In other words, I wish it to be understood that, as regards several of the forms here enumerated, I do not pledge myself to affirm that they are specifically distinct. Nevertheless, taking them up serially in the order given, I have a few remarks to offer respecting each; and fortunately the end proposed will enable me to restrict my observations on certain forms within the narrowest possible limits.

1. *Holostoma alatum*.—Flukes are sparingly found in the carnivorous mammalia generally; therefore the Trematoda being represented by a single species in the dog need not excite surprise. Though rare in the dog, this fluke is not uncommon in its congeners, the Fox and Wolf. Under a variety of names its structure and relations have been carefully studied; but there is no ground for supposing that its existence is either directly or indirectly injurious to man.

2. *Spiroptera sanguinolenta*.—I am not aware that any one has

distinctly indicated the presence of this parasite in dogs dying or destroyed in this country; but it appears to be tolerably frequent in France and Germany. I believe it to be identical with the round-worm, which is known to be common in China and not unfrequently to cause the sudden death of its canine host. Some years ago a manuscript was placed in my hands, giving a detailed account of the ravages inflicted by these parasites; but I fear the paper has been irretrievably lost. Dr. Hughes Bennett, of Edinburgh, has in his possession a Chinese dog's heart which had burst during life from the pressure occasioned by a large number of these parasites lodged in the ventricles. In the year 1813 a round worm, probably referable to this species, was found in the heart of a dog at Paris; and there is some probability that the microscopic hæmatozoa, first discovered by Grube and Delafond in the blood of dogs, are genetically related to this species. I shall again have occasion to remark upon this point*.

3. *Dochmius trigonocephalus.*—This small parasite is probably not uncommon in this country, but it is either frequently overlooked or disregarded on account of its apparent unimportance. It is not likely that the migrating progeny are the source of the verminiferous condition of the blood just alluded to. Its prevalence is certainly very variable in different countries or districts; but the only accurate observations bearing upon this point are those given by Dr. Krabbe in his recent Danish work†. Out of 500 dogs which he had examined (after death) at the Royal Veterinary and Agricultural College at Copenhagen, only nine contained this parasite, whilst in 100 dogs dissected in Iceland it was entirely wanting. His experience, as regards its prevalence in other members of the canine race, coincides with that of ob-

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* Since this paper was announced I have received a letter from Dr. Jones Lamprey (Surg. 67th Reg.), confirming the facts above mentioned. Writing on the 15th inst., he says:—"I take the liberty to inform you that I have found some remarkable entozoa in the cavities of the hearts of dogs in China, which I have sent to the Museum of the Army Medical Department at Netley, together with an account of them. I do not believe they have been, as yet, described." I (Dr. C.) may also add that since this paper was read I have reexamined Prof. Bennett's preparation, and, by his permission, have removed and retained one of the parasites. It measures exactly 10 inches in length.—T. S. C.

† Helminthologiske Undersögelser i Danmark og pad Island, med sæligt Hensyn til Blæreormlidelserne paa Island. Af Dr. med. Krabbe. Kjœbenhavn, 1865. [The above facts are taken from the Danish work; but Dr. Krabbe has since brought out a French edition of his treatise, and has likewise, through M. Blanchard, communicated a résumé of his researches to the French Academy. —T. S. C.]

servers generally; for he found this entozoon in three Danish foxes, and also in a blue or Arctic fox (*Canis lagopus*) which died in Dr. Kjærbolling's menagerie. It is worthy of remark that the last-named animal had originally come from Iceland. The importance of noticing these particulars and of indicating all the rarer forms of canine entozoa will appear in the sequel.

4. *Trichosoma plica.*—This parasite, like the previous species, is much more common in the fox than in the dog; but the possibility of its occurrence in the latter should be born in mind. So far as I am aware, the only direct proof we have of its liability to infest the dog rests upon the statements of Dr. Bellingham. The circumstance of its not inhabiting the alimentary canal will readily account for its not having been often seen although it should afterward turn out to be comparatively frequent in occurrence. The organization of the species has been sufficiently well investigated by Rayer; but its precise genetic relations remain to be cleared up. It is by no means improbable that the progeny of the preceding species, as well as of this entozoon and of the form next to be noticed, passes through phases of development closely resembling those of *Trichina.* Thus it may happen that an inexperienced observer finding these larvæ, in the act of migrating, in the flesh of any "host" might be induced to conclude that he had discovered examples of the fleshworm-disease, when in truth he had only encountered the offspring of parasites totally distinct. Mistakes of this kind have occurred over and over again in reference to a minute and little-known parasite which infests the cat; and doubtless nearly all the sexually immature forms of parasites described as new species by their respective discoverers are the offspring only of some of their more or less familiarly known representatives.

5. *Trichocephalus depressiusculus.*—This parasite is likewise common to the dog and fox, and, though on the whole more prevalent in the former, cannot be said to be frequent in either. I have only seen one or two examples. Out of 144 dogs dissected at Vienna it was only noticed four times; and in sixty-two foxes examined at the same place, not one was encountered. On the other hand, Dujardin found this species present in two out of seven foxes dissected by him at Rennes. It does not appear to have come under Dr. Krabbe's observation in any of the 600 dogs which he examined in Denmark and Iceland. I regret that I retain no accurate data respecting the prevalence of this and several other of the less frequent parasitic forms which I have

encountered from time to time in dogs. Until lately the value of such peculiar statistical records, in reference to our domestic animals, did not fully strike me; but from 1855 to 1864 inclusive I noted down all the parasites encountered in less common "hosts." Part of the fragmentary results thus obtained I have already communicated to the Zoological Society*.

6. *Trichina spiralis.*—This interesting parasite is probably not indigenous, so to speak, in the dog; but the ease with which it may be transmitted, and the frequency of its introduction by experiment, oblige us now to class the fleshworm with other canine entozoa. Until lately it was supposed that *Trichina* might be made to infest any warm-blooded animal; but recent experiments (conducted by Mr. Simonds and myself at the Royal Veterinary College in London, and on a more extended scale by Drs. Pagenstecher and Fuchs at the Zoological Institute at Heidelberg) incontestably prove that the fleshworm, as such, cannot be reared in birds. Having already offered a detailed account of these experiments to the Society, it is only necessary that I should remark that I have repeatedly reared *Trichinæ* in the dog from the flesh of man and animals. Except in a very indirect manner, the dog itself is scarcely likely to communicate the fleshworm disease to man; nevertheless if the flesh of a trichinized dog were eaten by us, the malady would be readily propagated. There would moreover be considerable danger in allowing trichinized dogs to roam at large; for the consumption of their flesh (after death) by other animals, such as rats, for example, would convey the disorder to new "hosts," which again might convey it to the pig, and ultimately to man. It has, indeed, been fully proved that in some instances swine have been infected by eating dead rats and the decomposing remains of other trichinized animals; and it is quite certain that rats, not previously made the subject of experiment, have been found to contain *Trichinæ* in their muscles. Dr. Krabbe informs me, by letter, that he has discovered trichinized rats in Copenhagen; and the same thing has been noticed in Germany. Dogs and cats alike may also become infected from this source. Bearing in mind, therefore, the variety of sources whence the dog may obtain *Trichina*, no one need in future be surprised at finding this animal affected with the disease; and since the malady is so readily transmissible, care should be taken to destroy, thoroughly, all trichinized animal flesh wherever and whenever encountered. In illustration of the facts above

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* 'Proceedings,' for March 26, 1861.

given, I may mention that I have caused *Trichinæ* to be transferred from the flesh of man to a hedgehog, then from the muscles of this hedgehog to a dog, and ultimately from the dog to a pig. It was in this last-named animal that I obtained about 15,000,000 *Trichinæ*—enough to have trichinized half the inhabitants of London, could each individual have been induced to partake of a minute portion of the uncooked flesh. As it was, I had some difficulty in persuading bystanders at the *post mortem* dissection that the perfectly healthy-looking flesh had anything the matter with it; and one person actually carried off the heart of the animal as a perquisite. Fortunately *Trichinæ* do not stay in the substance of the heart, although they pass through it; and thus the lucky person who ate the heart could by no possibility have sustained any injury, even if it were insufficiently cooked. Lastly, I will only add that I consider further experiments with *Trichina spiralis* unnecessary, and even undesirable from a hygienic point of view.

7. *Ascaris marginata.*—Of all the parasites infesting the dog in England this species is the commonest. I have met with it in about thirty out of forty dogs dissected by myself and friends. It does not appear to be quite so common abroad; nevertheless, out of 144 dogs dissected at the Vienna Museum, it was present in no less than 104 instances. At Copenhagen Dr. Krabbe found it present 122 times out of 500, or in 24 per cent. of the dogs he examined; but in Iceland, where other forms of canine entozoa are extremely abundant, only two dogs out of 100 were found to entertain this species. Fortunately the common roundworm of the dog is a very harmless parasite, so far as the health of the people is concerned, and it is apparently only in exceptional instances that it proves injurious to the dog itself.

8. *Eustrongylus gigas.*—This species is probably the rarest of canine entozoa. The only specimen which I have seen as coming from the dog is the very perfect one preserved in the Museum of the Royal Veterinary College, London. Probably not one in 5000 dogs harbours this entozoon; but since it is liable to occur in man, and has several times been noticed in the congeners of the dog, the possibility of its becoming more frequent should be considered. The Museum of the Royal College of Surgeons, London, contains some fine examples and several dissections of this parasite.

9. *Bothriocephalus latus.*—Although there is some difficulty in determining the number of species of *Bothriocephalus* liable to

infest the dog, it is generally agreed that this form is both human and canine, so to speak. In either case it is believed that the "host" acquires possession of the parasite by the consumption of fish. Dr. Knoch, of Petersburg, believed he had succeeded in rearing this species in dogs by direct experiment with its embryos; but the necessity of an "intermediary bearer" has been clearly established by Leuckart. The presence of *Bothriocephali* in the dog in this country is very rare. One such cestode may be seen in the Museum of the Royal Veterinary College; and no doubt can be entertained that it belongs to this species.

10. *Bothriocephalus cordatus.*—This form is quite distinct from the above, and seems to be very abundant in the dogs of North Greenland, where it also occasionally infests the human body. In the dog it occurs in considerable numbers, and can scarcely fail to occasion the animal more or less distress; but we have no evidence to show that it gives rise to any inconvenience in the human subject, where, so far as is at present known, it either exists singly or in very small numbers. Its comparative abundance in the dog doubtless depends upon the more ready access which that animal has to the uncooked food containing the larvæ, which latter are supposed to abound in marine fish.

11. *Bothriocephalus fuscus.*—Dr. Krabbe, of Copenhagen, described a variety of pit-headed tapeworms obtained from dogs in Iceland, all of which appear to be distinct from the above species. He recognizes three separate kinds (*B. fuscus*, *B. reticulatus*, *B. dubius*), severally presenting marked features of their own; but he is not prepared to affirm that these characters have any specific value. I do not now discuss this point, but I may remark, in passing, that the preparations of *B. cordatus* sent me by Prof. Leuckart, and the specimens of *B. fuscus* presented to me by Dr. Krabbe, afford convincing proof of the distinctness of these two forms. Taking the *Bothriocephali* as a whole they only occur in the ratio of 5 per cent. in Iceland, whilst Dr. Krabbe's investigations also show that in Denmark they are very much less frequent. In the 500 dogs examined at Copenhagen he only found one infested. It is by no means improbable that one or other of the forms will be discovered in this country.

12. *Tænia marginata.*—The tapeworms, properly so called, are far more numerously represented than the *Bothriocephali*; and this is one of the commonest forms. The frequency with which I have encountered it leads me to conjecture its presence in at least 25 or 30 per cent. of our English dogs. In Denmark it is

rather less abundant, being found, according to Krabbe, in 14 per cent. whereas in Iceland it is remarkably prevalent, occurring in no less than 75 out of the 100 dogs which he examined. This parasite is seldom found alone, and, being the largest species liable to infest the dog, proves a formidable guest to its canine host Up to the present time it has not been described as occurring in man; nevertheless I have seen portions of a tapeworm, apparently referable to this species, which I was assured had come from the human subject. From the first, I expressed the strongest doubts as to its source. The dog acquires this parasite by swallowing the large cestode larvæ which are frequently attached to the viscera of the sheep. Dr. Möller, as is well-known, tried to rear this parasite in himself, by swallowing the fresh uncooked larvæ (*Cysticercus tenuicollis*), but he did not succeed; and consequently we are not at present warranted in concluding that this species can under any circumstances develope itself in man. Mr. Simonds and myself have succeeded in rearing several examples of this entozoon in the dog by direct experiment. One or two instances are on record of the occurrence of the larvæ of this species in man; and I have myself pointed to affirmative evidence in yet another case. In none of these examples is there any reason to suppose that the larvæ in question did any harm; yet it would be very unadvisable to allow of steps being taken which could promote its more frequent development within the human host. Sewage-distribution where dogs abound would aid in securing this undesirable end.

13. *Tænia cœnurus*.—This species is likewise obtained from the sheep, though by no means exclusively so, as some imperfectly informed persons seem to suppose. Its prevalence in the dog, however, is comparatively rare. I have succeeded in rearing it without any difficulty, but I do not remember to have encountered the entozoon in any dog which had not previously been made the subject of a Cœnurus-worm-feeding. I need hardly say that its larval form (*Cœnurus cerebralis*) gives rise to the "gid" in flocks; but it also proves detrimental to several other animals. Indirectly, therefore, it affects man himself; yet, in this country, the "gid-disease" is seldom sufficiently prevalent to cause serious loss to the sheep-breeder. In other countries, Hungary for example, losses on this score are said to be very considerable. In Denmark Dr. Krabbe encountered this entozoon in only 1 per cent. of the dogs he dissected, but in Iceland he found it in no less than 18 per cent. Clearly the "gid" must abound in that country. It is

not generally known, even by those who have some acquaintance with helminthological matters, that the larvæ of this tapeworm sometimes infest the rabbit, giving rise to a formidable disease having its seat in the muscles and soft parts of that animal. In a paper communicated to this Society, I have already explained that Mr. C. B. Rose, F.G.S., was the first to direct attention to this important fact; but his explicit statements on this head have been either carelessly overlooked, or purposely disregarded. I regret to observe that there are persons who, whilst fairly recording the information they obtain from foreign writers, appear to be studiously careful to avoid giving credit to the labours of their own countrymen. In the curious discovery before us we have another unexpected source indicated whence the dog may obtain the adult parasite, and thus, in its turn, afflict another group of creatures with the so-called bladder-worm disease.

14. *Tænia cucumerina.*—Without doubt this is the commonest of all the forms of canine entozoa. I have little hesitation in saying that it is present in two out of every three dogs at present living in this country, excluding puppies up to three months old. Krabbe found it present in 48 per cent. at Copenhagen, and in 57 per cent. in Iceland. It appears to be very prevalent throughout Europe, and probably is more or less so in all other countries. So far as we know, the cucumerine tapeworm is a tolerably harmless parasite; but, notwithstanding the efforts of investigators, nothing certain is understood respecting its true larval source. In the adult state it sometimes occurs in prodigious numbers, and often associated with other parasites. In one valuable animal, a pointer, which died suddenly, I found between 500 and 600 of these parasites, associated with numerous examples of three other kinds of entozoa. Clearly, in this particular instance, entozoa were the cause of the dog's death. If the canine tapeworm species, *which are dangerous* to human life, became as abundant in this country as the harmless *Tænia cucumerina* is thus shown to be, our mortality would be increased by many thousands annually. This will be made more apparent in the sequel.

15. *Tænia serrata.*—Though by no means so abundant as the preceding, this form is nevertheless sufficiently common, whilst it is also more injurious to the bearer. Taking one variety of dog with another, I should say that it occurs in at least five per cent. of our English dogs; but in harriers and greyhounds I have little doubt that its presence is all but invariable. At Copenhagen Dr. Krabbe only encountered this parasite once; and in Iceland it

seemed altogether wanting. The practice of giving the viscera of hares and rabbits to sporting dogs (which I have myself occasionally witnessed in the field) will always ensure its prevalence in this country. On five or six separate occasions I have reared this tapeworm in dogs by the administration of the larvæ (*Cysticercus pisiformis*) taken from recently killed rabbits. It is one of the most easily reared of all the canine parasites, and, if due attention be paid to the form and size of the head and its conspicuous crown of hooks, cannot well be confounded with its allies. The older helminthologists are not trustworthy respecting the prevalence or otherwise of this species on the continent, since they regarded several distinct forms as identical. Even Dujardin was sceptical respecting the distinctive characters, severally, of *Tænia serrata*, *T. marginata*, and *T. crassiceps* (of the fox).

16. *Tænia litterata.*—This well-marked form is described by Dr. Krabbe under the name of *T. canis lagopodis*; but notwithstanding the priority of Rudolphi, I prefer the subsequent and more distinctive nomenclature of Batsch, especially also because the parasite is not by any means peculiar to the Arctic Fox (*Canis lagopus*). Here we know nothing of this parasite; and it may be that it does not exist in England. On the other hand, its general resemblance to *Tænia cucumerina* may have caused it to be overlooked. In seems from Krabbe's extended researches to be altogether wanting in Denmark; but in Iceland he found it in 21 of the 200 dogs which he there dissected. In the absence of any definite knowledge respecting its larval source, it may be assumed, as regards man, to rank amongst the so-called harmless species. The joints (judging from the specimens kindly sent me by Dr. Krabbe) have somewhat the appearance of those of Bothriocephali, owing to the central and ventral disposition of the reproductive organs. The orifices themselves, however, are not actually visible, though probably present in thoroughly mature segments.

17. *Tænia echinococcus.*—I come now to speak of a parasite of the highest interest in relation to public health. Though fortunately extremely rare in the adult condition, it is nevertheless sufficiently abundant to produce occasional fatal results by means of its larvæ. What is the actual amount of human mortality thus annually caused in this country it is not easy to say; nevertheless I know it to be something considerable; and there is reason to fear, in the absence of due precautions, that it may become much greater. The larvæ or *hydatids* are familiar to every hospital

surgeon. The adult parasite has frequently been reared by foreign experimenters; but although several hydatid-feedings have been administered to dogs in England, only one such feeding has, so far as is known, been attended with positive results. This instance has recently been communicated to the Royal Society, the experiment having been made by Mr. Edward Nettleship*. I am sorry to believe also that I may have previously reared this parasite. I say "sorry," because the subject of the experiment, a small black dog, was liberated, by an ill-designing person, a few hours before the time I had appointed for destroying it. It is true that I had previously, in one or two other dogs, obtained only negative results; but in those instances none of the conditions likely to ensure success were so favourable as in the case of the liberated animal. At all events, Mr. Nettleship, following up the experiment after a precisely similar method to that I had adopted, obtained a complete success. The freedom of one animal harbouring *Tænia echinococcus* must be fraught with serious danger to the community; and yet it is to be feared that at the present time several dogs thus infested roam at large in this country. Certainly I have no desire to add to their number. In Copenhagen Dr. Krabbe encountered this parasite in *two* only out of 500 dogs; and yet the parasite is probably more abundant in Denmark than in England. In Iceland, on the other hand, where the mortality from the hydatid- or echinococcus-disease embraces one-sixth of all who die in that country, Dr. Krabbe found 28 dogs out of 100 harbouring this entozoon. Up to the present time no person, I believe, in England has seen this parasite in any dog which had not previously been made the subject of experiment.

In order to obtain an approximately correct notion as to the amount of echinococcus-disease prevalent amongst us, I devoted some three or four weeks in the winter of 1864 to an examination of the collections of entozoa contained in nine of the principal Pathological Museums of the metropolis. The results of this search, independently of data derived from other sources of evidence, have convinced me that hydatids are far more prevalent than is generally imagined. In these collections I found no less than 195 instances of hydatid-disease out of a total of 368 cases of helminthiasis of all kinds. It is my deliberate belief that not less than 400 deaths annually occur in England from this source. Doubtless, if one could acquire correct statistical evidence re-

* 'Proceedings,' vol. xv. No. 86, p. 224.

specting the amount of fatality from all the entozootic diseases combined, the rate of mortality from parasites would be considerably larger than this figure, by itself, implies; yet it fortunately happens that comparatively few of the other kinds of entozoa at present prevalent in England lead to fatal results. Such cases are exceptional. It is equally certain, on the other hand, that much misery and discomfort is produced by the less hurtful species. A very great deal of good might accrue from the acquisition of more extended evidence respecting the prevalence or otherwise of all the known forms of entozoa infesting man and the domestic animals in this country. A report of this kind, drawn up somewhat after the fashion of the present communication, would, I conceive, prove highly useful. Such a report should not be a mere record of helminthic epidemics collected from foreign sources, but should be a sound and scientific contribution based upon a practical knowledge of entozoa acquired by years of previous reseach (extended, if possible, by personal observations made in various parts of the country and under every variety of circumstances). It is one thing to give a literary *resumè* of the progress of this department of science abroad, and another to record the actual position in which we stand in respect of entozootics at home. Except by exclusive and prolonged devotion to this subject no great ultimate good can be accomplished. A properly qualified person, always on the alert, could embrace many opportunities of special research which must of necessity be lost to the mere closet report-maker. In illustration of this let me give an instance. In the '*Times*' of Saturday, July 14th, 1866, we read that "Among the claims presented to the Glamorganshire Court of Quarter Sessions, was a claim for poison used in killing stray dogs at Merthyr; another was from the chief inspector of the Swansea police for killing 100 dogs, at 1*s.* each; while the third was from a person who charged one guinea for the removal and interment of three cartloads of the dead bodies of the dogs." Now, I have no doubt whatever as to the wisdom of destroying these animals; but here is an example of one of those lost opportunities of investigation to which I have alluded. An examination of the bodies of these animals would have been particularly instructive if conducted in relation to the great subject of entozootics. Much more might be said on this head; but I leave it for a future occasion.

18. *Pentastoma tænioides.*—This parasite resides in the nasal cavity and frontal sinuses of the dog, but it is comparatively rare

in England. In the young state, and under a different name (*P. denticulatum*), it is frequently seen in the human body on the continent. Its mode of introduction into the latter "host" has not been ascertained with certainty; yet there can be very little doubt that the sneezing of an infested dog in the face of any person would readily transfer the eggs and embryos of the parasite from one host to the other. In like manner, and by the same means, the ova may be cast over and become attached to food, and then be subsequently conveyed to the human stomach. Fortunately its presence in man appears to be unattended with danger; yet any considerable number of these parasites could scarcely fail to produce more or less inconvenience. In Germany it seems to be rather abundant; for Frerichs (no mean authority) states that it is "far more common in the human liver than the echinococcus." In confirmation of this statement it has been shown to be present in from 5 to 15 per cent. of *post mortem* examinations conducted in different German cities. I have myself frequently encountered this parasite in the juvenile state in animals, but not in the human body. The Pentastomes recently described by Dr. Aitken, from the human liver, belong to another and more formidable species. Strictly speaking, these creatures are not true entozoa, although their habits often cause them to be classed as such. Their mode of introduction into the nostrils of the dog is readily accounted for, since the larvæ are constantly present in the flesh of herbivorous mammals, and must frequently, during the act of feeding, be brought in immediate contact with the dog's nose.

19. *Cysticercus cellulosæ.*—Two or three authors (Gurlt, Chabert, and Hartwig) have stated that the common measle of the pork-tapeworm is liable to occur in the dog; and since we know that it is occasionally found in man, there is no good reason for doubting the correctness of their conclusions. It has been found attached to the membranes of the brain, in the muscles, and in the cavity of the abdomen. If the dog were a thoroughly suitable "host," this larva would in all likelihood be much more common in the canine bearer than it is at present supposed to be. The possibility of its occurrence and the probability of its having been frequently overlooked should both be considered in reference to future investigations in this direction.

20. *Filaria trispinulosa.*—This little parasite, once found by Gescheidt in the eye of a dog, is probably only a sexually immature form of *Ascaris.* The specimen, however, was one-third

of an inch in length, and recorded as a female. It does not appear to have since been met with.

21. *Filaria sanguinis.*—Under this title I have a few more words to say respecting the so-called hæmatozoa of MM. Grube and Delafond. These investigators, some years back, examined 480 dogs, and in nearly five per cent. they found Filariæ in the blood. The parasites were extremely minute, their diameter being less than that of the dog's blood-corpuscle! There can be no doubt that they were larvæ of some known, or unknown, species of nematode. I have already hinted that these hæmatozoa might be the brood of *Spiroptera sanguinolenta*; yet in only one instance were sexually mature nematodes (of comparatively large size) found in the heart. In this case the authors obtained six specimens, "of which four were females and two males; and they were lodged in a large clot occupying the right ventricle." They measured from ½ to ¾ of an inch in length. MM. Grube and Delafond believed they had encountered a new species, and accordingly gave it the long name of *Filaria papillosa hæmatica canis domestici.* In most of the dogs the entire circulatory system does not appear to have been examined; therefore it is quite possible that adult worms may have been present in more instances than the one specified—perhaps in several. If such had been proved to be the case, it might have been fair to have inferred a genetic relation between the microscopic hæmatozoa on the one hand and the worms in the heart on the other. As the matter now stands, we are in doubt as to the true adult representative of these minute *Filariæ.* With the verminiferous blood MM. Grube and Delafond performed a variety of curious experiments, but they did not, so far as I am aware, employ any worm feedings. They satisfied themselves that the hæmatozoa could only live, as such, in the blood itself, and they estimated that the verminous dogs severally entertained from 11,000 to about 224,000 of these larvæ. In no case, however, had the infested animals appeared to suffer inconvenience.

Conclusion.—I have thus, in a condensed form, brought together a large number of facts having reference to the frequency of occurrence and variety of entozoa liable to infest the dog. The way in which I have treated the subject is somewhat novel, my object being to open up a new field of inquiry, bearing more less closely on questions of public health. The full importance of helminthology in relation to entozootics can only be understood by expositions of this kind, based upon investigations extending over a long period of time. To do justice to the subject, one must not only be acquainted with the commoner forms of entozoa, but also, to some extent, with the rarer. The experimental method enables us to determine the origin and course of development of many forms, and helps us to discriminate between the harmless and baneful species. Systematic zoology, apart from its own abstractedly scientific value, is of great assistance in aiding our arrangement of the facts in a methodical and easily understood manner. A consideration of all the known facts relating to any one particular entozoon often permits us to state precisely to what extent the species is injurious to the human race as well as to the particular intermediary bearer. We are also frequently in a position to point out what circumstances are sure to increase, or, on the other hand, to decrease, the prevalence of any particular species. We can even go further than that, and show how certain forms may be entirely eradicated. At all events, we have it in our power both to diminish the number of human sufferers from entozootics, and to check, if not entirely to prevent, the invasion of these endemics. Substantial results of this kind being patent to all intelligent people, we can afford to disregard the policy of the ignorant who deride our labours. From researches such as these, the Linnean Society cannot legitimately withold its sympathy, since a recognized department of natural-history science is thus made practically subservient to the public welfare. In the present case, moreover, this communication, though differing somewhat from the ordinary character of its received contributions, is, after all, only a continuation of my other papers which have already been honoured with the Society's approval.

Note on the "*Spiroptera sanguinolenta*" of Rudolphi, a Parasite found in the Heart of Dogs in China. By W. Baird, M.D., F.L.S. With an Account of the Occurrence of these Worms at Shanghai, by J. Lamprey, M.D., 67th Regiment.

[Read May 2, 1867.]

At the conclusion of Dr. Cobbold's paper on the Entozoa of the dog, read on the 18th of April, Dr. Lamprey called the attention of the Society to the fact that the dogs of China, both native and European, were peculiarly liable to the attack of a species of Entozoa, lodging in the heart. This worm has been referred to the "*Spiroptera sanguinolenta*" of Rudolphi, a species which has already been noticed as existing in the heart of the dog. Since the reading of Dr. Cobbold's paper, Dr. Lamprey has kindly presented a series of specimens of these Entozoa to the British Museum. Upon examination, I found them to be of a much larger size than any of those recorded by Rudolphi, Dujardin, and Diesing. These authors agree in stating the length to be from 40 to 80 millims., about equal to from 1¾ to 3 inches. The specimens sent to the Museum were, many of them, at least 10 inches long, which would show that the habitation where they were found was favourable to the growth of these worms. Along with the specimens sent, Dr. Lamprey has kindly forwarded to me a short account of these parasites, written by him at Shanghai in 1865, which I thought might be interesting to lay before the Society.

Shanghai, July 1865.

The Entozoa were found mixed with clotted blood in the cavities of the ventricles of the heart, and extending through the openings of the valves, in the course of the pulmonary artery and aorta.

The hearts of native and foreign dogs living at Shanghai are invariably found to contain these Entozoa, which most probably have their origin in the ova of the Ascarides or Trichiuris, human excreta being the principal food of the native dog, and not disliked by the foreign dog however well fed. Tapeworm is a common accompaniment of this disease.

These Entozoa, *per se*, do not appear to interfere with the general functions of the body, so long as the animal is otherwise healthy. Sporting dogs work as usual without any impediment, and many are long-lived; but should dogs so infested be attacked with disease, such as fever or inflammation of the lungs, the Entozoa become a serious embarrassment to the circulation, and no doubt materially aid in causing a fatal termination to the disease with which they are attacked.

These Entozoa have not been as yet discovered in the human heart, either of Chinese or of Europeans living in China.

P.S. In 1866, when at the Cape of Good Hope, I lost a dog which I brought from China. This dog was attacked with fever, and died; and on examination of his body I found a large bundle of these Entozoa in the cavities of the heart. I had examined other dogs which died of the same fever at the Cape, and no Entozoa were found in their hearts; these dogs had not been in China.

J. L.

Further observations on *Cygnus Passmori* and *C. buccinator*. By the Rev. W. Hincks, F.L.S.

[Read June 6, 1867.]

Toronto, May 19, 1867.

My note of April 10, 1864, published in the Journal along with my paper on *Cygnus Passmori*, although intended to leave the question undecided, would doubtless be considered to favour the opinion that the supposed species is no more than a younger and less-developed form of *C. buccinator*.

I was not, indeed, myself satisfied with that opinion, which set aside all my observed distinctive marks except that taken from the sternum, and assumed that, because specimens were procured indicating progressive changes in the appearance of this part, all these changes could be reduced to one series; but it was my duty to report the facts which came to my knowledge; and for the moment these seemed to be at least reconcilable with the notion of only one species.

I have since taken every opportunity of obtaining further materials for judging, and as the result of the past winter's observations I can lay before the Society such additional facts as may, I think, enable us to settle the question.

I have now before me six sterna of our northern swans, the the comparative size and external appearance of each of the birds being also known to me. One of these belongs to the original specimen named by me *C. Passmori*, the stuffed skin of which now forms part of the collection of Western Canadian birds sent by the Board of Arts and Manufactures of Western Canada to the Paris Exhibition. Two others are those which formed the subject of my note of April 10, 1864, being successive states, both of them with less enlargement of the trachea than in the first specimen, but otherwise corresponding with *C. Passmori*, of which they are doubtless younger specimens. The series of changes in these three suggested the idea of a progress of development which might be thought to terminate in the very remarkable sternum and trachea which I described as properly belonging to *C. buccinator*.

At that time I had but one specimen of this curious form, which belonged to a full-grown male Trumpeter, and I had not seen what I could be sure was the young of the Trumpeter, to ascertain its agreement or otherwise with my supposed species. I was thus, perhaps, too hasty (though, it now appears, substantially correct) in supposing the two forms of sternum before me to be both mature, and consequently belonging to different species; but the doubt is now, I think, decided. During the past winter a female Trumpeter Swan with a very young male (a cygnet of the year) were shot in the immediate neighbourhood of this city. They were examined by me, and their sterna are before me.

The female, a mature bird, had a sternum exactly resembling that which I previously possessed (fig. 7 of the sketches accompanying my paper), proving the peculiarity to be neither a mark of sex nor an unusual exceptional case. The young male had the foxy colour on the head and neck which is characteristic of *Cygnus buccinator*, but (as might have been anticipated from other cases of the kind) with the colour stronger and more extended than in the old bird, thus differing strikingly from *C. Passmori*. His sternum is considerably longer than that of my largest *C. Passmori*, a little longer even than that of the female accompanying him; yet the trachea is in an early stage of development, the bone on the inner posterior face of the sternum not yet appearing, and the knob close to the vertical bone only equalling the height of the ridge of that bone, instead of rising, as in the mature bird, about an inch above it. In the specimen of *C. buccinator* previously examined the bony enlargement containing the curve of the trachea almost concealed the posterior sinuses of the sternum, as noticed in my former paper; but in the young bird we find them deeper and more elongated in form than in *C. Passmori*; and even after the formation of the bone, this difference may be observed by careful examination. On the whole, this young bird may be regarded as proving that *C. Passmori* is not the mere young of *C. buccinator*, from which, as well as from the old bird, it differs in size, weight, colouring, and the other characters pointed out, even the sternum differing before the trachea assumes the peculiar full-grown appearance. But there is another point settled by the additional specimens. I have now before me, both in the young and mature condition, the bronchial tubes of the two species, those of the true *buccinator* having been, as I stated, destroyed in the former specimen, and the extent and constancy of the differences reported being then uncertain. I can now state that, in *C. Passmori*, the lower portions of the bronchial tubes are separate and comparatively little swelled, the upper tubular parts being nearly parallel; whilst, in *C. buccinator*, the greatly swelled and enlarged lower portions adhere together, the upper tubular parts receding from one another at a curve. This seems to be a constant and important character. I hope these details, taken in connexion with the statements made in my former paper, will be thought to justify the strong conviction I now entertain that *C. Passmori* must be received as a species. The close resemblance in general external appearance, with the difference in size, weight, and a few points of structure, may remind us of *Bernicla Hutchinsii* as compared with *B. Canadensis.* These birds are still often confounded even by sportsmen, the former being passed as the young of the latter; yet no doubt can be entertained by the scientific zoologist of their being specifically different.

I am indebted to Mr. Passmore for his attention in procuring my additional materials, and for his valuable aid in some of the investigations required.

Supplement to the List of Australian *Longicornia.*

By Francis P. Pascoe, F.L.S. &c.

[Read June 20, 1867.]

The most interesting of the following additions to the *Longicornia* of Australia are from Cape York, the extreme northern point of the continent. They were a part of a small collection of Coleoptera made by a German naturalist, which had doubtless previously yielded some of its choicest specimens to the Sydney entomologists. Judging from what remained, the collection had a completely Australian character, a few of the commoner forms of the middle and southern portions being, however, very feebly or not at all represented—*i. e.* the Buprestidæ, Hesthesis, the Stenoderinæ, Phoracantha, the smaller Lamellicornia, &c.; of one of the Colydiidæ, *Dastarcus porosus,* Walk., hitherto only found in Ceylon and Borneo, there were several specimens. Of the Lamiidæ, the genera *Sodus, Atyporis,* and *Menyllus* * have now to be added to the Australian fauna. *Batocera læna,* Thoms., and *Pelargoderus Arouensis,* both hitherto restricted to New Guinea, appear to be common. *Glaucytes,* a genus found in the New Hebrides, some of the Malayan islands, and even in Madagascar, has now a representative in Australia.

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* *Menyllus maculicornis,* from Aru, described by me from a single specimen, not in the best condition, in the Wallacean collection, was unfortunately forgotten when I described *Sysspilotus Macleayi,* with which it is identical. The latter name must therefore be cancelled.

To Dr. Howitt, of Melbourne, I am indebted for not less than four new species of *Athemistus*. This genus appears to take the place in Australia of the European *Dorcadion*. I have also a Tasmanian specimen of *Dorcadida bilocularis*, White, from the same gentleman, who observes that this and *Lacon variabilis* are the only Coleoptera known to him common to Australia and New Zealand; to these, however, may be added *Epithora dorsalis*, MacLeay.

Besides the new species characterized in this paper, I have described the following since the Society did me the honour to publish the list of Australian Longicornia in their Journal, viz.:—

Demomisis filum, Champion Bay, Ann. & Mag. Nat. Hist. May 1867 (3rd ser. vol. xix.) p. 310.

Thoris eburifera, Rockhampton, *l. c.* p. 317.

Thephantes clavatus, Darling Downs, *l. c.* p. 319.

Elaptus simulator, Cape York, *l. c.* June 1867, p. 413.

Petalodes, in consequence of its having been previously used, was changed to *Anastasis*.

HEBESECIS BASALIS.

H. cinerascens; prothorace vittis duabus, elytris regione scutellari et fascia postmediana fuscis, his basi crista pilosa instructis.

Hab. Rockhampton.

Pale ashy; head obscurely clouded with ochreous and brown, a dark brown Λ-shaped mark on the vertex; prothorax with the disk bituberculate, ochreous at the base, bounded by a dark brown stripe on each side; scutellum squarish; elytra with an ochreous patch below the scutellum, margined with dark brown except posteriorly, a narrow band behind the middle also dark brown, the base on each side with an oblong crest composed of closely set erect dark brown hairs, each elytron with three or four longitudinal ochreous lines; body beneath and legs with a coarse whitish pubescence, the middle of the abdomen nearly glabrous, black; antennæ nearly twice as long as the body, brown, ringed more or less with white, the sixth and eighth joints entirely white. Length 4½ lines.

This species approaches *H. niphonoides* in coloration; but the pilose crest at the base of each elytron is peculiar to it.

ATYPORIS INTERCALARIS.

A. (♀) nigrescens; prothorace vitta glabra æneo-nigra, lateribus ochreo tomentosis; elytris breviusculis, pube cinerascente tectis, et ochreo maculatis.

Hab. Cape York.

Derm blackish; head covered with a greyish tomentum, two glabrous stripes on the vertex; prothorax with a broad central stripe, gradually broader towards the base, glabrous, nitid, and sparingly punctured, and on each side a dense ochreous tomentum; scutellum nearly semicircular; elytra rather short, and somewhat cylindrical, irregularly punctured, the punctures black and glabrous mixed with small patches of ashy pubescence spotted with ochreous; body beneath and legs covered with an irregular greyish tomentum; antennæ rather longer than the body, with small spots of greyish. Length 5 lines.

Five species of this genus are described in 'Long. Malay.', all from Batchian and New Guinea; the present has shorter and more cylindrical elytra than the others, but in coloration comes near *A. jubata.*

RHYTIPHORA ARGUS.

R. pallide ochraceo-fulva; elytris mediocriter nigro maculatis, maculis parvis, distinctissimis, niveo annulatis, humeris glabratis, nigris, nitidis, apicibus oblique truncatis; antennis nigris.

Hab. Rockhampton.

Pubescence very dense, pure pale ochreous yellow; head impunctate, a white line round the eyes; prothorax short, cylindrical, transversely rugose, a few small punctures on the middle; scutellum narrow, rounded behind; elytra covered, but not crowded, with numerous small, black, very distinct spots, those at the base granulated, each surrounded with a well-limited, snowy white ring; the shoulders naked, glossy black, also surrounded with a white ring; the apices sharply and obliquely truncate; body beneath, femora, and tibiæ with a bright ochre-yellow pubescence, slightly patched with whitish; tarsi paler; antennæ black. Length 12–14 lines.

Allied to *R. polymita,* but the spots much less crowded, with the glossy black on the shoulders well-limited, and the apices of the elytra obliquely truncate, not rounded. It is one of the handsomest species of the genus.

RHYTIPHORA INTERTINCTA.

R. pallide fulva; prothorace nigro fasciato; elytris obscure nigro maculatis, maculis plus minus conjunctis, humeris supra albis, infra glabratis, nigris; antennis nigris, niveo annulatis.

Hab. South Australia (Gawler).

Pubescence pale fulvous; head glabrous, black, with patches of fulvous pubescence in front, two stripes on the vertex, line round the eyes, and a bar behind them also fulvous; prothorax with two distinct bands of fulvous, and some irregular patches between them, and an elevated glabrous transverse line in the middle; scutellum subscutiform; elytra entirely covered with a short dense pale fulvous pubescence obscurely spotted with black, each spot paler posteriorly and blending more or less with those behind it, those towards the base also connected transversely, and forming slightly undulating bands; body beneath yellowish spotted with black; femora and tibiæ yellowish, the tarsi ashy; antennæ black, the basal half of each joint from the third to the ninth inclusive snowy white. Length 10 lines.

A very distinct species, which for the present may be placed after *R. semivestita.*

PENTHEA MACULARIA.

P. dense pubescens et nigro setulosa, albida, confertim nigro maculata; prothorace linea longitudinali glabrata; elytris disperse punctatis, haud costatis.

Hab. North Australia.

Densely pubescent, with scattered black setulose hairs, whitish or greyish white, with small black crowded spots; head sparingly punctured, impressed median line nearly obsolete; prothorax with few punctures, a smooth longitudinal line on the disk; scutellum semicircular; elytra not ribbed, the punctures scattered, very irregular, free from pubescence, and confined to the black spots; body beneath whitish, spotted with black and ochraceous yellow; legs whitish; antennæ dark brown, the scape and apex of the third joint whitish. Length 5–5½ lines.

Allied to *P. intricata* and *P. miliaris*; but the absence of costæ on the elytra, the glabrous line on the prothorax, and the uniform spotting will readily distinguish it.

SYMPHYLETES ANAGLYPTUS.

S. robustus, fusco tomentosus, supra lineis minutis brevibus irregularibus fulvis vestitus; prothorace in medio bituberculato; elytris subtrigonatis, apicibus subtruncatis.

Hab. Rockhampton.

Stout, covered above with a brownish tomentum and speckled with very small numerous short irregular fulvous lines composed of a longer tomentum, the brown spaces between them not larger than the lines themselves; head more fulvous in front, with black lines; prothorax constricted anteriorly, irregularly tumid, the middle with two small tubercles placed transversely; scutellum somewhat rounded; elytra subtrigonate, with six glossy black granules on each side at the base arranged in two rows, the apices subtruncate, nearly hidden by longish hairs; body beneath with a coarse irregular buff pubescence; legs spotted with a brown and buff pubescence; antennæ considerably longer than the body, densely fringed beneath. Length 12 lines.

A very distinct species which may rank after *S. fumatus*; the anterior coxæ are spined in my specimen.

SYMPHYLETES CAPREOLUS.

S. angustatus, rufo-brunneus; elytris parallelis, apicibus rotundatis, basi, scutellum includente, maculisque suturalibus ferrugineis, utrinque plagis duabus albidis ferrugineo signatis instructis; antennis omnino fuscis, griseo pubescentibus.

Hab. Rockhampton.

Narrow, reddish brown; head covered with coarse greyish and ochreous hairs; the antennary tubers rather large and approximate; prothorax cylindrical, finely punctured, with an almost obsolete greyish pubescence, with three vertical ferruginous lines on each side; scutellum rounded, glabrous, with a tuft of ferruginous hairs in the centre; elytra nearly parallel, somewhat elongate, the apices rounded, a ferruginous triangular patch at the base, enclosing the scutellum, and a few spots of the same colour along the suture, on each side, at equal distances from the base and apex and each other, two large white patches marked more or less with pale ferruginous; body beneath and legs with a thin greyish pile, the edges of the abdominal segments with a denser border of yellowish hairs; antennæ entirely brown, sparsely covered with greyish hairs. Length 5 lines.

The smallest and least robust proportionally of all the species of this large genus, and easily distinguished by the two white patches at the sides combined with the triangular ferruginous patch at the base of the elytra. I have seen some specimens much lighter in colour with the ferruginous spots along the suture absent.

SODUS VENOSUS.

S. sericeo-griseus; capite fusco-griseo; prothorace fulvo-griseo, postice constricto; elytris utrinque paulo excavatis, in medio planatis.

Hab. Cape York.

Silky grey; head brownish grey, closely and finely punctured; prothorax not quite so broad as the head, constricted, and rather narrow posteriorly, covered with a dense fulvous grey pubescence, the disk bituberculate, the apex of each tubercle crowned with a few longish setæ; scutellum indistinct; elytra irregular, the middle of each side slightly excavated, the disk between flattened, the pubescence on these parts very thin, with a few small scattered punctures, posteriorly the pubescence much denser; body beneath and legs reddish brown, with a thin grey pile; antennæ with the first three joints brown and closely punctured, the remainder with an ashy pubescence. Length 5 lines.

This is a very interesting addition to the genera of the Australian insect-fauna, the only two other species of *Sodus* being from Singapore and Penang respectively; although unmistakeably congeneric, they are very distinct, the Penang species (with the prothorax dilated posteriorly and the slight emargination of the intermediate tibiæ) being the most aberrant. They are all covered, especially the antennæ, with long scattered setulose hairs. The irregularity of the elytra of the species before us is exceptional: and this, with the marked difference of density of the pubescence, gives them a variegated appearance. The following are the amended diagnoses of the two Malayan members of the genus:—

Sodus verticalis (Pascoe, Long. Malay. p. 137, pl. vii. fig. 5). *S.* fuscus, nitidus; genis, vertice, antennisque basi, niveis; prothorace turgido, postice paulo constricto; elytris regularibus. *Hab.* Singapore.

Sodus ursulus (Pascoe, Proc. Zool. Soc. 1866, p. 237, pl. xxvi. fig. 2*). *S.* fulvo-brunneus, opacus, capite pallidiore; prothorace basi latiore; elytris regularibus, late ovatis. *Hab.* Penang.

LYCHROSIS AFFLICTUS.

L. pubescens, niger, obscure cinereo varius; scutello parvo, triangulari, indistincto; antennis fere nigris.

Hab. Cape York.

Thickly pubescent; head finely punctured, glabrous, black, the cheeks with a whitish pubescence; prothorax quadrate, the sides nearly parallel, pubescent, white, with three ill-defined glabrous black stripes; scutellum small, triangular, nearly hidden by white hairs; elytra irregularly punctured, the punctures large and well-marked at the base, pubescence thin and black, sprinkled with a longer white pilosity, the apices very obliquely emarginate; body beneath and femora with a thin ashy pile, the abdomen greyish, the last segment black; tibiæ and tarsi greyish; antennæ nearly entirely black, the bases of the four or five last joints slightly tinged with white. Length 5½ lines.

Much longer and more cylindrical than *L. luctuosus*, and entirely without the large well-marked white patches which distinguish that species.

HATHLIODES COSTULATUS.

H. supra brunneo-ochraceo pubescens; elytris basi prothorace latioribus, costulatis, apicibus dehiscentibus.

Hab. Champion Bay.

Rather short, covered above with a close brownish-ochraceous pubescence with small whitish setæ interspersed; head nearly impunctate; prothorax with a few scattered punctures on the disk, a brownish stripe on each side behind the eyes; scutellum semicircular; elytra finely punctured, broader than the prothorax, each with raised lines, including one at the suture, but not extending to the apex, the sides rather abruptly declivous, the apices dehiscent; body beneath and legs coarsely pubescent, dark ochreous; antennæ about two-thirds of the length of the body. Length 6 lines.

Resembles *H. quadrilineatus*, but shorter, without darker stripes, and the elytra with raised lines.

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* The figure is too brightly coloured, and the prothorax is not represented sufficiently broad at the base.

PHÆAPATE DENTICOLLIS.

P. griseo pubescens; prothorace utrinque dentato, disco fusco; elytris in medio cinerascentibus, apicibus oblique truncatis.

Hab. Rockhampton.

Derm dark brown, with a greyish pubescence; head covered with shaggy hairs in front, not concealing the small scattered punctures; prothorax with a small sharp tooth on each side, the disk with a broad subglabrous stripe, well limited at the sides, and very distinctly punctured; scutellum very broad, dark brown, glabrous, minutely punctured; elytra with two raised longitudinal hairy stripes at the base, united towards the middle, another at the shoulder, a large pale ashy patch in the middle common to both elytra, the apices obliquely truncate; body beneath, legs, and antennæ covered with loose greyish hairs. Length 5 lines.

Easily distinguished from *P. albula* in colour, and by the small lateral tooth of the prothorax; except in fresh specimens, the raised hairy lines on the elytra are unnoticeable.

ATHEMISTUS BITUBERCULATUS.

(Howitt's MS.)

A. vinaceo-fuscus; prothorace tuberculato, sparsim impresso-punctato; elytris confertim granulatis, postice bituberculatis, apicibus oblique truncatis, angulo externo obsoleto.

Hab. "Mountains of Victoria."

Claret-coloured brown, thinly pubescent; head almost impunctate, except on the vertex; prothorax nearly equal in length and breadth in the male, shorter in the female, sparingly punctured, the disk with four to seven tubercles (three intermediate nearly obsolete); scutellum very small and indistinct; elytra narrowly ovate, covered with small elongate granules arranged in somewhat oblique lines, on the declivity posteriorly on each side a large mamillary tubercle, the apices oblique, the external angle nearly obsolete; body beneath and legs reddish brown; antennæ not quite the length of the body (♂), but shorter in the female. Length 5½ lines.

Differs from all the other species of the genus, except *A. Æthiops*, in the two posterior tubercles of the elytra.

ATHEMISTUS HOWITTII.

(*A. kiamæ*, Howitt's MS.)

A. fulvo-fuscus; prothorace fere impunctato, quinquetuberculato; elytris tuberculis nitidis instructis, apice singulorum truncato, angulo externo acuto.

Hab. Kiama (New South Wales), Clarence River (Queensland).

Pubescent, fulvous-brown; head with few punctures; prothorax nearly impunctate, its disk with five tubercles, the three anterior oblong shining; scutellum small, narrowly triangular; elytra narrowly oblong, scarcely so broad as the prothorax in the male, covered with not very closely arranged glossy oblong tubercles in somewhat oblique rows, the apices truncate with the external angle acute; body beneath dark brown; legs and antennæ pale, the latter in both sexes not so long as the body. Length 5–5½ lines.

Very like *A. rugosulus*; but the latter (*inter alia*) has the apices of the elytra rounded, and the prothorax much more punctured.

ATHEMISTUS PUNCTICOLLIS.

A. fuscus, pilis erectis minutis dispersis; prothorace confertim punctato, utrinque tuberculo rotundato fere obsoleto.

Hab. Omeo (Gippsland).

Dark brown, finely pubescent, with numerous small erect hairs interspersed; head with few punctures; prothorax closely punctured, on each side above the lateral tooth a low rounded very indistinct tubercle; scutellum small, narrowly triangular; elytra narrower than the prothorax (♂), covered with elongate shining granules in nearly regular rows, the conjoined apices rounded; body beneath, legs, and antennæ dark brown, the latter much shorter than the body. Length 5½ lines.

The short flying hairs of this species, with the non-tuberculate (or nearly so) and closely punctured prothorax, at once differentiate it; in *A. pubescens*, the only other setosely pilose species, the hairs are much larger and longer.

ATHEMISTUS ÆTHIOPS.

(Howitt's MS.)

A. ater, opacus; prothorace grosse punctato, quinquetuberculato; elytris confertim verrucosis, postice bituberculatis, apicibus truncatis, angulo externo obsoleto.

Hab. "Mountains of Victoria."

Black, opake, pubescence with a brownish tinge; eyes rather approximate above; prothorax coarsely punctured, the disk with five tubercles, the three central much less distinct; scutellum broadly triangular; elytra ovate, broader than the prothorax in both sexes, closely covered with warty tubercles, which are much larger at the shoulders, posteriorly on the proclivity of each elytron a prominent tubercle, the apices rounded; antennæ in both sexes above two-thirds of the length of the body. Length 3½ (♂)–4½ (♀) lines.

A small black species, like *A. funereus*; but the two posterior tubercles on the elytra are sufficiently distinctive*. Dr. Howitt, to whose kindness I am indebted for the new species of this genus here described, mentions a still smaller one than this, taken in an ants' nest near Sydney, in company with *Cordus hospes*, Schön., and *Lacon geminatus*, Cand. Another many-spined species, found under a log of wood at Brisbane, is also alluded to.

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* Dr. Howitt mentions, in his note on this species, that the "spot on the disk of the elytra when first taken is snowy white." An exceedingly indistinct spot, which I at first overlooked, may be detected with a good lens nearly in the middle of each elytron. There are also traces of yellowish patches at the base or sides of the prothorax in some other species.

GLAUCYTES SUTURALIS.

G. fuscescens, capite, prothorace, maculisque elytrorum griseo-argenteis, pubescentibus; elytris octomaculatis, regione suturali depressis, griseo pubescentibus.

Hab. Cape York.

Light brownish, shining, head and prothorax closely covered with a silky greyish-silvery pubescence, a few punctures in front between the antennæ, none on the prothorax; scutellum small, rounded behind; elytra with eight spots and a broad central stripe covered with a silky greyish pubescence, the rest glabrous, very distinctly punctured, the suture flat or even somewhat hollowed from a point a little behind the scutellum nearly to the apex, which is truncate, with a strong spine at the external angle; body beneath black, shining, a very thin whitish pubescence along the sides; femora pale reddish brown, white at the base; tibiæ and tarsi blackish; antennæ dark brown. Length 5 lines.

Allied to *G. scitulus*, a Batchian insect, but different in colour and distribution of pubescence, and at once distinguished by the concave depression along the suture; another species is found in the New Hebrides, and two more in Madagascar. The genus certainly does not belong to the *Tmesisterninæ*, in which it has hitherto been placed.

STRONGYLURUS CERESIOIDES.

S. testaceo-fuscus, disperse albo pilosus; prothorace vix longiore quam latiore, grosse punctato, albo quadrimaculato; elytris modice elongatis, apice rotundatis.

Hab. Tasmania.

Testaceous brown, with dispersed stiffish hairs clothing the upper surface; prothorax not longer than broad, coarsely punctured, the punctures closely approximate but not confluent, four white spots on the disk, the two posterior largest; scutellum rounded, white; elytra moderately long, thickly punctured, rounded at the apex; body beneath and legs with long whitish hairs; antennæ with the first two joints glabrous, shining, the remainder pubescent, opake. Length 6 lines.

A species resembling *S. scutellatus*, Hope, but with a shorter prothorax, differently punctured, and broader elytra in proportion to their length, of uniform colour.

On the Anatomy and Physiology of the Tunicata.

By Albany Hancock, F.L.S.

[Read June 20, 1867.]

Having employed myself recently in the investigation of the Tunicata (their anatomical structure and physiology) with a view to a monograph of the British species, which my late lamented friend Mr. Alder and I had undertaken to prepare for the Ray Society, some very interesting anatomical facts have come to light; and I now propose to give a succinct account of the more important of these, believing that they cannot fail to be acceptable to those naturalists who may have studied these low but not by any means unattractive mollusks. I reserve, however, for some future occasion a more complete and detailed description.

When I took up this subject, I had little expectation of meeting with much that was new; for perhaps in no other group of the Molluscan subkingdom hast he anatomy been so frequently and so ably investigated as it has been in the Tunicaries; and, indeed, in them, all the leading points appear to have been fully determined; but experience proves, nevertheless, that much of interest has been left unobserved, quite sufficient to reward the labour of reexamination, and seemingly ample enough to modify some of the more important morphological determinations.

This unexpected result may, in part, be owing to the fact that, while my researches have been chiefly confined to the simple Ascidians, it is apparently to the compound, social, and pelagic forms that the greatest attention has been hitherto given. Thus it happens that numerous details have remained until now unnoticed in the former group.

There is something fresh to record in nearly all the visceral organs, but in none so much perhaps as in the vascular and respiratory systems. Before entering, however, on such new matter, it will be well to say a few words respecting the tunics, so characteristic of these animals. In all the various forms that have been examined, there is no great difficulty in determining the presence of three tunics, or envelopes—namely, the test or outer tunic, the mantle or inner tunic, and the lining membrane or inner tunic of Prof. Huxley.* The lining membrane and mantle are always, to a greater or less extent, adherent to each other, and have, except where there is an abdomen developed, all the viscera and the lacunary portion of the blood-system placed between them. On the other hand, the mantle and test in *Ascidia* and *Molgula* are always free, except at the distal extremity of the respiratory tubes, where they are united; there is also an attachment at the point where the vascular trunks enter the test. But in the genus *Stycla* (Savigny's third tribe of *Cynthia*) the test is always more or less firmly attached to the mantle throughout, though at the respiratory orifices the adhesion is greatest. In all the species, however, that have been examined, with the exception of one (a small undescribed species), these two envelopes may be separated without much difficulty in specimens preserved in spirit. In the exceptional case alluded to, the mantle is exceedingly delicate; and hence probably arises the difficulty of separating it from the test. In this genus, as well as in *Ascidia* and *Molgula*, blood-vessels pass from the body to the test. It is therefore likely that vessels will be found ramifying in the outer tunic in all the simple Ascidians. In *Pelonaia* the adhesion of the mantle and test is not by any means so remarkable as was originally supposed; and, indeed, in this form they are as easily divided as they usually are in *Stycla*. Also in *Clavelina* these two tunics are slightly adherent throughout, while in *Salpa* they appear to be as free as they are in *Ascidia**.

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* This tunic was first pointed out by M. Milne-Edwards, in his work on the Ascidies composées, p. 54.

It should be mentioned that, in a living state, unless the mantle be violently contracted, there is no actual vacant space, or space filled with fluid, as has been asserted, between it and the test; even in those species which have these tunics comparatively free the two surfaces lie in close contact. When the animal is dead, however, and preserved in spirit, the body enclosed in the mantle does not by any means occupy the entire space within the test, but lies somewhat shrivelled, and frequently quite free, just as commonly happens with the animal of the Lamellibranchs under similar circumstances.

The chief function of the test, like that of the shell in the higher mollusks, is no doubt to protect the comparatively soft and delicate portions of the animal that lie within it. But it will also act, by its resiliency, as a counterpoise to the muscular contractility of the mantle, which lines it as it were. In those species, such as *Stycla tuberosa*, in which the mantle and test are adherent throughout, this action is readily understood; it is not,

* I have examined only one species, namely *S. spinosa*; and the specimens were preserved in alcohol.

however, quite so obvious in the species which have these two tunics comparatively free, as they are universally in *Ascidia* and *Molgula*. But we have just seen that, in such instances, the inner surface of the test, and the outer surface of the mantle, lie in close contact with each other. Now, as under all ordinary circumstances, the pressure of the water inside the mantle must be as great as that of the water resting against the outer surface of the test, and as no water can possibly enter between these two tunics, it is clear enough that they will be held together with no inconsiderable force. Thus, when the muscles of the mantle contract, diminishing the bulk of that organ, the test will be drawn in after it; and so soon as the muscles of the former relax, the latter, through the elasticity of its walls, will expand, and the mantle will be constrained to do so likewise.

The most interesting matter that I have to communicate respecting the digestive system relates to the biliary apparatus. A remark or two, however, may be made, in the first place, upon the alimentary canal, which, in all the species that have come under my inspection, makes its first bend towards the dorsal region, assuming that to be the dorsal aspect where the endostyle is placed. The intestine then usually ascends and crosses over (in a more or less undulatory course, sometimes forming one or two loops) to the opposite or ventral side, where it again ascends to reach the cloaca, into which, in the Ascidians, it invariably opens. The walls, from one end of the organ to the other, are particularly firm, and do not collapse even in preserved specimens. The lower portion of the intestine is the most delicate; but even here the wall rarely shrinks. The stomach is well marked, though it is never very bulky, and is usually lined with a stout mucous membrane, which is frequently plaited or wrinkled, sometimes in a symmetrical manner, the plaits extending into the œsophagus on the one hand, and into the intestine on the other. In the latter organ this membrane is thrown up so as to form a very conspicuous groove, which extends from the stomach to that portion of the intestine which may be termed the rectum. In *Styela tuberosa*, and some other species, however, this groove extends the whole length of the intestine.

The food of the Tunicaries is extracted from sedimentary matters; there is no power of selection in the first instance; those particles which can be, are digested; the others, chiefly composed of sand and mud, are rejected in the usual manner. This sedimentary aliment is sifted from the water in the respiratory sac, by the aid of the branchial network, and is then carried across the organ by the action of cilia; but no definite arrangement of the particles takes place until they arrive at the oral or ventral lamina, where they are formed into a cord of some tenacity, apparently through the agency of mucus, and are carried thus moulded along this lamina to the oral orifice, and so swallowed. This alimentary cord is conducted through the digestive tube, and is rejected in the same form by the anus and excurrent tube. The cord-like fæces may frequently be seen through the wall in the lower portion of the intestine, having very much the appearance of a convoluted tube lying within the canal. In some of the lower forms, however, it is broken up into elongated pellets.

All this is very similar to what takes place in connexion with the alimentation in the Lamellibranchs; but in them the lateral currents of particles are as well defined as the main or central ones.

Molgula and Savigny's first and second tribes of his genus *Cynthia* appear to be the only forms among the simple Tunicates that have hitherto been described, as possessing a well-developed liver. This organ is always sufficiently distinct in these groups, and usually presents a laminated structure, but is occasionally composed of tubular tufts or lobes, the colour being generally of a dark olive-green. I find, however, a true hepatic organ in all the other genera examined (namely *Ascidia*, *Styela*, *Pelonaia*, *Clavelina*, and *Perophora*), quite distinct from that gland-like substance coating the alimentary tube in the first of these forms, and which has occasionally been considered to subserve the hepatic function.

This substance is of a very peculiar character, and it is difficult to say what its office really is. In all the *Ascidiæ* it forms a pretty thick coating over the stomach and intestine, and is composed of comparatively large globular vesicles, with thin reticulated walls, each having a large, opaque, simple or compound nucleus on one side. These vesicles have no communication with each other, though they lie in contact and are cemented together; nor are they connected with any duct, or in any way open into the alimentary tube. Blood-channels are hollowed out, as it were, amidst the vesicles; and the reproductive organs ramify throughout the agglomerated mass which overlies, for the most part, the true hepatic organ. These vesicles will therefore act as a sort of packing to the parts of these organs, and will give support and protection to them, whatever higher function they may have to perform. They may likewise assist the heart in the performance of its work by their resiliency when the mass is gorged with blood; for it is evident that, when the interstices or blood-channels are filled, the vesicles will be more or less collapsed in proportion to the pressure of the blood-current; and when the latter changes its direction the reaction will be assisted by their expansion. In our present state of knowledge, however, nothing positive can be said of the uses of this very curious structure.

The true hepatic organ, as already intimated, lies beneath this vesicular mass, and forms a thin coating on the surface of the intestine. In all the examples observed it is composed of delicate tubes, which divide dichotomously, but frequently without much regularity. At the points where the branches are given off, the tubes are usually enlarged, and the twigs terminate in rounded extremities more or less inflated. The ultimate divisions of the organ are so minute that they can only be observed by the aid of the microscope after a portion of the intestinal tube has been removed, laid open, and deprived of the mucous membrane, so as to render the tissue as transparent as possible.

In *Ascidia mentula* the dichotomous division of the tube is very obvious, and the enlargements or ampullæ at the junction of the branches are greater than usual, and they assume a triangular form; also oval enlargements frequently occur along the branches, which latter uniting go to form two long slender ducts that pass backwards within the loop of the intestine, buried amidst the vesicular substance already described, and at length open through the left wall of the stomach, about midway between the cardia and pylorus, towards the anterior margin. These two ducts come from the middle portion of the intestine; another duct, passing from the lower part of the intestinal tube, unites with one of those first mentioned, just before it sinks into the wall of the stomach. All the three ducts are exceedingly slender; and for their detection it is necessary to dissect carefully the vesicular matter within which they lie buried: when thus exposed their white walls can easily be traced, with the aid of a good lens, running amidst the comparatively dark surrounding tissue.

In *Ascidia sordida* and *A. scabra* the arrangement of the parts of the hepatic organ is similar to that in the above species; but in *A. parallelogramma* the minute structure is considerably modified. In this species there is a minute network of anastomosing tubes spread over the intestine, the tubes being divided into systems by the interruption of the anastomoses along certain lines where the twigs end in blind sacs, which are occasionally a little enlarged and rounded. The main branches leading from the network exhibit a tendency to divide dichotomously, and unite to form two slender ducts, which pass at once from the intestine to the left side and close to the posterior margin of the stomach, into which they pour the biliary secretion a little in advance of the pylorus.

In *Pelonaia* there is only one hepatic duct, which is very slender, and passes in a fold of the lining membrane or "inner tunic" of Huxley, that extends from the intestine to the right side of the stomach, a little way in advance of the pylorus. Before terminating, it receives a twig or two from the surface of the stomach; so that in this genus the liver is apparently not confined to the intestine, but is also spread over a portion of the stomach. The ultimate twigs divide dichotomously with considerable regularity, and terminate in round or ovate vesicles, which are very numerous and form a distinct, opaque, yellowish layer.

The liver in *Styela* is not more conspicuous than it is in *Ascidia*. It is well developed nevertheless, and is provided with its secreting vesicles and ducts. In *S. tuberosa*, and, indeed, in all the members of this genus that have come under my observation, there is a fold of the lining membrane within the loop of the alimentary tube, which passes between the stomach and intestine. This fold is united to the pyloric end of the stomach, where there is a cæcal prolongation of that organ. The hepatic ducts lie within this fold; and before they reach the stomach, in this species, they unite to form a simple, slender duct, which opens into the left side of the cæcum. The branches of the ducts ramify dichotomously over the lower portion of the intestine, and communicate with comparatively large rounded vesicles, arranged like those in *Pelonaia*.

In *Clavelina* there is only one hepatic duct, which passes from the middle portion of the intestine, and opens into the alimentary tube immediately below the rounded stomach. The branches of the duct ramify over the intestine, dividing dichotomously, and ending in comparatively large, oval vesicles. Exactly the same form of organ is observed in *Perophora*; but in this genus the duct opens through the right wall of the stomach, near the pylorus. The hepatic organ in this interesting form was undoubtedly noticed by Dr. Lister; for he figures and describes, in his well-known memoir in the 'Philosophical Transactions'*, "transparent vessels" ramifying over the intestine; but he does not appear to have observed the terminal vesicles, and the termination of the duct in the stomach, or he scarcely could have supposed, as he did, that the vessels he described were lacteals.

With this exception, this peculiar form of the hepatic organ seems entirely to have escaped notice until A. Krohn gave a very good description of a similar structure in a paper "On the Development of the Ascidians," published in Müller's Archiv, 1852–53†. The species examined by this naturalist was *Ascidia mamillata*; and although he appears to have traced with great accuracy the development of the organ, he seems to have failed in detecting the duct in the adult animal. From the general characters, however, obtained by his examination of the young and adult combined, he is disposed to conclude that the "secretion prepared in the cæca must be accessory to digestion; but whether or not the watery secretion is bile, and the gland therefore a liver," he concludes, "must for the present be left undecided." Nevertheless, after the above description of the numerous modifications of the organ, and particularly when the position of the duct in relation to the alimentary tube is taken into account, few physiologists will be inclined to doubt that this organ is a true liver, though low and rudimentary in structure.

The reproductive organs are well developed in the Tunicates; and in all of them the two sexes are combined in the same individual, though the male and female elements are always secreted by distinct organs, which, however, frequently compose one or more compound masses that have the parts so intimately united that careful examination is required to detect them; hence in several of the *Cynthiadæ* the testis has been entirely overlooked: the oviduct and *vas deferens* are likewise constantly distinct.

In *Ascidia sordida*, the ovary is composed of numerous tubular branches, which ramify in a radiating manner over the left side of the looped portion of the intestine. The oviduct passes through the loop, and, following the curvature of the intestine, opens by the side of the anus into the cloaca. The *vas deferens* terminates near to the same point, and is adherent to the oviduct throughout its course. In the vicinity of the ovary it receives several much attenuated branches from either side of the intestine; these divide dichotomously, the ultimate twigs terminating in elongated and irregularly lobulated vesicles, which are spread over the intestinal tube, and which also exhibit a tendency to dichotomous division: these vesicles secrete the male element.

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* "Some Observations on the Structure and Functions of Tubular and Cellular Polypi and of Ascidiæ," Phil. Trans. 1834, p. 380.

† See 'Scientific Memoirs,' edited by Henfrey and Huxley, p. 328. Before I was aware of the discovery by Krohn, I had worked out the details of the hepatic organ in the genera mentioned in the text; it was therefore highly satisfactory to find his description of this organ in *A. mamillata* agree so closely with my observations, particularly in *A. mentula*.

In *A. scabra*, *A. affinis*, *A. mentula*, and *A. venosa* the same arrangement of the reproductive organs is apparent; but the ovary in *A. mentula* is a lobulated organ, and, lying within the loop of the intestine, is seen at both sides of the alimentary tube, and consequently has the appearance of being double; and in *A. venosa*, the male vesicles are exceedingly minute and are very numerous. In *A. parallelogramma* the genitalia have much the same disposition; the ovary, however, which is branched and lobulated, is spread out on both sides of the alimentary tube—as is likewise the male organ, the secerning vesicles of which are clustered into dendritic systems.

These organs, however, are modified to a much greater extent in the *Cynthiadæ*—in many of which it is not easy to determine the parts, on account of their intimate union; and very careful examination is requisite in these cases. In *Styela tuberosa* the so-called ovaries are very numerous, and are studded over the inner surface of the mantle, on both the right and left side of the body, causing the lining membrane to bulge out. When fully developed they form protuberant, ovate, orange-coloured masses, each having at the attenuated extremity a projecting nipple-like papilla. This is the oviduct, leading out of the ovarian mass or ovigerous sac; for each mass is really a sac, in the walls of which the ova are developed. And firmly attached around the base of these sacs is a series of pale oval vesicles, which are sunk in the substance of the mantle, and which form for each sac a sort of cup within which it rests. These vesicles are the male secreting organs, and their ducts, extremely delicate tubes, pass upwards over the surface of the sac, and go to join, on the median line, a slender *vas deferens*, which, passing forward, terminates at the extremity of the short nipple-like oviduct above described. Thus it is seen that the so-called ovarian mass is a compound organ, combining both the male and female parts, each with its proper secreting organ and duct. There are therefore as many oviducts and outlets for the male secretion as there are compound reproductive masses; and the eggs must be shed everywhere into the space between the branchial sac and the wall of the respiratory chamber, and afterwards carried by the atrial currents to the cloaca, and so pass out, as usual, by the excurrent tube.

These reproductive masses should not be confounded with other very similarly formed bodies that everywhere stud the mantle, and fill up, to a considerable extent, the spaces between the former. These latter bodies are most frequently pedunculate, and are sometimes as large as the reproductive masses, from which they chiefly differ in colour, being pale, somewhat pellucid, and almost homogeneous in structure. They do not seem to have any high functional import, their office apparently being to form, along with the generative bodies, a sort of pad or level surface for the support of the branchial sac, which otherwise might suffer from the inequality produced by the genitalia. These peculiar organs are found in all the *Cynthiadæ* that have been examined, including *Pelonaia*, in all of which the reproductive organs project boldly from the surface of the mantle.

This arrangement of the reproductive organs also occurs in *Styela mamillaris*, and in two undescribed species of the genus, recently obtained by the Rev. A. M. Norman at Guernsey. In *Thylacium aggregatum* the same disposition of these parts is also found to exist.

In *Cynthia ovata*, an undescribed species allied to *C. squamulosa*, we have a very remarkable modification of these organs. Here there are only two generative masses—one placed immediately above the alimentary tube, the other within the intestinal loop. They are elongated and fusiform, each being composed of a double parallel series of squarish nodules, in which both ovary and testis are combined. Each mass has its own proper oviduct, and *vas deferens*, which pass forward, united, between the series of nodules, and, extending a little way in advance of the organ, open into the cloaca near to the anal orifice.

But perhaps the most interesting variety of this apparatus occurs in *Pelonaia*, in which there are two elongated tubular ovaries, each being bent so as to form a wide loop; they are attached throughout to the mantle, and bulge out the lining membrane; one is on the right, the other on the left of the branchial sac in front of the greater portion of the alimentary tube. The oviducts advance a short way beyond the ovaries, and open into the cloaca, one on each side of the intestine, but considerably in advance of the anal orifice. The testis is composed of numerous elongated, simple or lobed vesicles, which are placed with one end in contact with the sides of the ovaries, and are arranged in parallel order at right angles to them, fringing both sides of these organs from end to end. From the proximate extremities of the vesicles extremely delicate ducts pass across the surface of the ovary, to which they are attached, and go to join the *vas deferens* that extends along the middle line from end to end of each ovigerous organ, and, advancing along the oviduct, terminates at the extremity of that tube.

I have not met with this peculiar arrangement of the genitalia in any other species, though, after all, it is but, as it were, an amplification of that which we have seen to exist in the compound genital masses in *Styela tuberosa* and its immediate allies. If one of these masses were greatly elongated, so as to become tubular, and if the male vesicles were increased in number, their lower extremities pulled from beneath the ovigerous sac, and stretched out on the mantle, we should have something very similar to that which subsists in *Pelonaia*.

Another modification of these organs occurs in *Styela variabilis*, an undescribed species related to *Cynthia Canopus*, Savigny. In this the ovaries assume the form of distinct, wide, slightly undulated tubes, of which there are two on the right and two on the left side of the mantle, each having its own short nipple-like oviduct, which opens into the cloaca, there being two on each side of the anus. The testis is composed of numerous irregularly lobulated vesicles scattered over the lower portion of the mantle, in the vicinity of the posterior extremities of the ovaries, but with which they have no connexion, each separate vesicle having its own short nipple-like duct or *vas deferens*.

The reproductive organs do not exhibit any great diversity in the genus *Molgula*, the ovary and its testis being always combined, and forming one or two elongated masses, in which, however, the two component elements can always be detected by the aid of their colour and structure. The testis is composed of a vast number of branched vesicles or cæcal tubules, crowded together and sometimes assuming a dendritic appearance, while the ovary seems to be a lobulated sac, usually well filled with eggs.

In *M. conchilega* there are two such masses, placed transversely, which are generally irregular in form, but sometimes are broadly fusiform, and a little arched. That on the right side of the mantle lies upon the upper border of the intestine; the other occupies the centre of the left side of this tunic. The oviducts are two short tubes; they pass out of the ventral or anterior extremity of the mass, and open into the cloaca on each side of the intestine. There are four or five long nipple-like sperm-outlets, situated at a little distance from each other along the body of the organ. These open directly into the atrial space on either side of the branchial sac.

A similar arrangement of the genitalia, with numerous short deferent canals, has been described by Van Beneden, in his *Ascidia ampulloides**, which is, there can be little doubt, a *Molgula*. There are two similar genital masses in *M. simplex*; but they are comparatively slender, and are pretty regularly fusiform; they are situated exactly in the same way as those in the former species; but that on the right side is overlapped by the looped portion of the intestine.

In an undescribed species obtained by the Rev. A. M. Norman in Guernsey, the genital masses are ovate, and are placed as usual, but differ from those of all other species in having the oviducts passing from their dorsal extremities, and consequently turned towards the endostyle instead of being directed to the cloaca. The products of these organs are consequently thrown into the dorsal portion of the atrium, far from the cloaca.

There is only one reproductive mass in *M. arenosa*; it is larger than usual, is of irregular form, and belongs to the right side of the mantle, but overlies to a considerable extent the alimentary tube. The oviduct, as usual, opens into the cloaca; but the *vas deferens* has not yet been observed, though the male secreting organ is distinctly visible, forming a considerable part of the mass.

In *Clavelina lepadiformis*, one of the Social Ascidians, the genitalia are placed in the loop of the intestine, near to the lower extremity of the abdomen, the ovary lying on the right of the alimentary tube, the testis being spread over both sides of it. The former resembles a bunch of grapes in which the berries are of various sizes; and the oviduct, like the stem of the fruit, is seen in the midst of the ova; and I believe I have traced it passing up the abdomen in the direction of the cloaca, but did not succeed in determining its outlet. M. Milne-Edwards, in his well-known work on the "Ascidies composées"†, states that he could not discover how the eggs passed from the ovary to the neighbourhood of the branchial sac, and suggests the possibility of the *vas deferens* acting also in the capacity of an oviduct. This, however, is exceedingly improbable; and, from what I have seen, there can be little doubt of the presence of a true oviduct, although I do not consider my observation a sufficient demonstration of the fact. But there can be no mistake as to the existence of a *vas deferens*; this tube is sufficiently conspicuous; passing up by the side of the alimentary canal, it penetrates the lower wall of the cloaca, and terminates by the side of the anal outlet. The testis is a much-branched organ; the branches are extremely fine, and, dividing dichotomously, terminate in numerous elongated fusiform vesicles, which are united in pairs; or, in other words, the ultimate twigs may be said to bifurcate, each branch being immediately enlarged, so as to form an elongated cæcal vesicle.

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* "Recherches sur l'Embryogénie, l'Anatomie, et la Physiologie des Ascidies Simples," Mémoires de l'Académie Royale de Belgique, t. xx., 1847.

† 'Observations sur les Ascidies composées des côtes de la Manche,' p. 22.

The blood-system in the Tunicata is perhaps the most difficult branch in the anatomy to investigate; for these animals are generally too minute and delicate to be successfully injected, and it is not easy to obtain living specimens sufficiently transparent to permit of the blood-current being traced through the tissues. Nevertheless much good service has been done in this way by M. Milne-Edwards and others; but perhaps no one has done more by this method than Dr. Lister, who had the good fortune to meet with a species in every respect suited to the purpose. So far as I have been able to ascertain, the blood-system has been as fully, if not more fully, determined in *Perophora* than in any other Tunicate. It is therefore satisfactory to find that my results perfectly agree with those obtained by Dr. Lister, so far as they go*. This is particularly gratifying, as the mode of investigation adopted by me is very different from that followed by this distinguished anatomist; and, moreover, *Perophora* is one of the Social, while the species used by me are all Simple Ascidians.

I have relied almost entirely on dissection, aided by the accumulation of blood-corpuscles in the various parts of the system. In this way the minutest ramifications can be traced with the greatest precision. A vast number of specimens, however, are required; for many individuals may be cut up before one is met with in a proper state. Large specimens, too, are necessary; and they must have the tissues sufficiently transparent, and the blood-globules opake or coloured; in such only can the blood-channels be distinctly traced. And when the specimens are even in the best condition, many may be opened before the blood-globules are found lodged in the part of the system requiring elucidation. This method is consequently very laborious; but the results are satisfactory; for in such natural injections there is very little danger of being deceived by the blood having extravasated from its natural channels.

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* Philosophical Transactions, 1834, p. 375.

Ascidia mentula and *A. venosa* are good species for this purpose; but the one that appears the best-adapted to this mode of investigation is an undescribed species closely allied to the former. In this the blood-globules are of a brownish colour and very numerous; so that it sometimes happens that in this animal large portions of the blood-system can be traced in a single individual. Most of the information, on this portion of the anatomy, has been obtained from these three species; but nevertheless several important points have been verified in the living animal.

The blood-system in the simple Tunicates may be looked upon as closed, how limited soever the true vascular portion of it may be. The blood-channels throughout the organism are well defined; but whether or not they are provided with proper walls, and, if so, to what extent, is not easy to determine. The trunk channels leading to and from the heart have certainly all the appearance of being true vessels; and the branchial network has likewise the character of being truly vascular. The blood-channels in the test have also distinct walls; but in this case they are apparently composed of a prolongation of the mantle or inner tunic. Traces, however, of an inner vessel may be observed in the main trunks; but this apparent vessel may be nothing more than a continuation of the lining membrane or "inner tunic" of Huxley. In fact, the so-called vascular ramifications of the test, however minute and divided, ought perhaps to be regarded as prolongations of the pallial cavity, although it is quite possible that they carry true vessels; and, indeed, from the way they are connected with the heart, this would seem almost probable.

The heart is tubular, and is of considerable length. In *Ascidia* it is attached to the lower border of the stomach, one end extending some way up the dorsal region towards the intestinal tube; this may be called the dorsal extremity; the other, the ventral end, points in the direction of the œsophagus. It lies between the mantle and the lining membrane, within a distinct chamber or pericardium, along one side of which it is attached from end to end. The chamber seems as if formed by a fold of the lining membrane; and the heart is probably coated with it in the manner of a peritoneum, and is so attached to the wall of the chamber.

A large trunk vessel passes from the dorsal extremity of the heart, and immediately divides into three branches, one of which advances between the mantle and the lining membrane along the dorsal region at the back of the endostyle; another passes in the opposite direction down the dorsal margin to the bottom of the branchial sac. These two form the great dorsal branchial channel, and are equivalent to the ventral or thoracic sinus of Milne-Edwards; and they both communicate with the dorsal extremities of the transverse channels of the branchial sac. The third branch turns off at right angles to this great dorsal channel, close to the point where it is united to the heart, and, in company with another vessel, to be shortly described, penetrates the mantle and goes to ramify in the test.

From the other or ventral extremity of the heart there are two large trunk vessels given off, one to each side of the stomach. These ramify over the digestive organs, and supply a minute network spread over both sides of the visceral mass; this network may be termed the visceral plexus. It is in direct communication with a similar plexus of blood-channels or sinuses that lies between the mantle and the lining membrane of the right side; and this latter is continuous with another plexus similarly situated in the left side of the mantle; these together form what we shall call the pallial plexus. The trunk branch that supplies the left side of the stomach and the portion of the visceral plexus there situated divides into two large stems, one of which inclines towards the intestine, the other towards the œsophagus; the former passes for some little distance along the intestinal tube, and then, leaving it, penetrates the mantle in the dorsal region, and goes associated with the third branch from the dorsal extremity of the heart, already described, to ramify in the test. Thus originates the double vessel that carries the nourishing fluid to and from that envelope or tunic. The stem that goes towards the œsophagus passes along by the side of the lower extremity of the intestine, and, just before reaching the anus, turns aside to join a large vessel that extends along the ventral margin from one end to the other of the branchial sac. This, which is the great ventral branchial channel, is the dorsal sinus of Milne-Edwards. It communicates with the ventral extremities of the transverse branchial channels; and its lower extremity bifurcates, a branch passing on each side of the mantle.

The two great branchial channels, the dorsal and ventral, communicate with each other, as we have already seen, by the numerous transverse channels of the branchial sac; they likewise intercommunicate above through a sufficiently obvious channel that encircles the entrance of the sac, immediately above the vascular network, and just below the anterior cord, afterwards described; the lower extremities also appear to communicate with each other by a much-constricted channel. Thus the circle of the blood-apparatus would seem at first sight to be complete; and as the opposite ends of the heart operate upon the two great branchial channels respectively, and as the blood oscillates first in one direction and then in the other, we might look upon the mechanism as sufficiently perfect for all the purposes of the circulation.

But something is still wanting, as is evident when we refer to the fact that the influence of the heart is chiefly confined to the branchial organ, the visceral plexus, and the vascular system of the test. The pallial plexus of the right side is certainly in connexion, as we have seen, with the visceral plexus of that side; but, so far as our examination extends, the plexus of the left side of the mantle is connected with the general system through the minute network of the pallial plexus only. It is obvious that the blood-current would be feeble in these parts, if the whole of the mechanism is now before us. And, moreover, it would be most languid in the left pallial plexus—in that very portion of the mantle, in fact, that is most amply supplied with muscular fibres, and which, being comparatively free, has undoubtedly the greatest mobility. Indeed, unless some additional means exist to aid the circulation, engorgement of the blood-channels must inevitably take place in the pallial plexus when the heart pulsates in the direction of the viscera; and when its action is reversed, exhaustion would ensue in this portion of the system.

Now, though the branchial sac is attached to the walls of the pallial chamber in front and behind and along by the dorsal margin, it is necessary that the lateral or reticulated portions of the organ should be suspended, and in such a manner as to leave a considerable space between the sac and the pallial walls. Consequently a number of suspenders are provided, which, while they retain the branchial sac in its proper position, allow the required space. These suspenders are in the form of cylindrical bands or ties, and are contractile; they pass from the transverse branchial channels and from the great ventral channel to the walls of the pallial or respiratory chamber; they are hollow or tubular, and are the means of communication between these blood-channels and the pallial plexus of both sides, and also with the visceral plexus of the left side. Thus the blood-currents in every part of of the organism are brought under the influence of the heart. One of the suspenders, larger than the rest, connected with the ventral branchial channel, opens into a considerable channel or sinus in the mantle in which the nervous ganglion is placed; and the vessel which carries the blood from the heart to the great branchial channel has also much the character of a suspender.

There can be no doubt whatever of the fact that the branchial suspenders are tubular, and that they carry the blood, as above stated, from the branchial network to the visceral and pallial plexuses. I have seen in several instances the channels in the suspenders gorged with blood-corpuscles, as well as the channels connected with them in the pallial and visceral plexuses, and the transverse channels of the gill-sac; and thus by such natural injections the fact has been demonstrated over and over again. And, moreover, I have witnessed blood-corpuscles pass through the channels in the suspenders in young living individuals of *Ascidia sordida*.

When the heart acts in the direction of the dorsal extremity, the blood will at once be thrown into the dorsal branchial channel, and will pass by the dorsal trunk of the compound vessel into the test; all the transverse channels of the branchial sac will be filled; and through the agency of the suspending tubules or vessels the pallial plexuses of both sides of the mantle, as well as the visceral plexus of the left side, will be supplied in all directions; while that portion of the blood-current that is retained in the vascular reticulation of the branchia will be hurried into the great ventral channel, and by this to the ventral extremity of the heart. But before it reaches so far it will be joined by the streams derived from the visceral plexuses of both sides of the body, and in this way with that from the pallial plexus, chiefly, of the right side. The greater portion of the blood from the left side of the mantle will reach the heart by the ventral branchial channel, having been brought hither by the suspenders. The blood thus returned will likewise have commingled with it that which is drained from the vascular system of the test by the ventral trunk of that system. It is thus apparent that the blood which arrives at the heart in this direction is only a partially aerated current.

When the action of the heart is turned in the opposite direction, just the reverse of all this takes place. The blood-current will now fill, in the first instance, the visceral plexuses of both sides, then the right pallial plexus; at the same time it will reach the great ventral channel of the branchial sac, and through it the transverse branchial channels; while simultaneously the blood will be pushed into the left pallial plexus through the suspenders placed along the ventral channel. The blood that now enters the vessels of the branchial sac will be joined by numerous streamlets issuing from the suspenders, and brought by them out of the visceral and pallial plexuses, and will ultimately arrive in the great dorsal channel, and so to the dorsal extremity of the heart, at which point it will be mingled with the current from the test brought by the dorsal branch of the compound vessel ramifying in that tunic —the trunk, in fact, that in the first instance carried the blood to the test. Here, then, as well as in the former case, the current returned to the heart is only in part aerated; but the aeration is undoubtedly more complete when the stream sets in this direction than in the other; for now the only unaerated portion is that from the test, while in the first case the blood from the visceral and pallial plexuses is likewise in a partially aerated condition.

The pulsations of the heart appear to vary considerably in number even in the same individual; and the numbers of the oscillations in the same direction seem never exactly to agree; neither is there any constancy as to whether the dorsal or the ventral oscillation has the greater number. In a young individual of *Ascidia sordida*, in which the movements of the heart were carefully observed, the pulsations were counted four times in each direction, and the following was the result. On the first occasion there were 73 beats in the ventral direction, 70 in the dorsal; on the second, 64 ventral, 68 dorsal; on the third, 74 ventral, 88 dorsal; and on the fourth, 63 ventral, and 64 dorsal. It required 2¼ minutes to accomplish the beats during a single oscillation. In another individual of the same species, considerably larger than the former, but still quite immature, there were 138 pulsations in one direction, and 120 in the other. Two or three of the concluding beats of each oscillation were not so vigorous as the rest; and when the action was about to change, a dead pause ensued of about two seconds.

In *Polyclinum aurantium* the pulsations were found to be 112 in one direction and 115 in the other; and on starting, the beats were slow. They afterwards became rather rapid, and before ceasing were again retarded; the action then stopped for a second or two before recommencing in the opposite direction. The pulsations in *Botrylloides radiata* are nearly as numerous as they are in the last species. In one individual 102 beats were counted in the one direction, and 115 in the other.

The above account of the circulation will be found to agree with Dr. Lister's description of it in *Perophora*, so far as it was determined in that form; but that excellent observer did not detect the flow of the blood through the suspenders, although "filaments" attaching the branchial sac to the mantle are described and figured by him. Their function as blood-carriers seems equally to have escaped detection by Van Beneden, though he must have been aware of their existence as bands or ties; for they were figured by Savigny*, who described them as ligaments attaching the branchia to the inner tunic, and they are well known to anatomists generally. Van Beneden, however, discovered the necessity of a passage for the blood-current from the "periintestinal cavity" to the branchia to prevent engorgement when the pulsations of the heart were continued for any length of time in one direction. He therefore believed that the required communication was effected through the agency of the "respiratory tentacles"†.

It will now, however, be of no avail to discuss the improbability of such an opinion, since ample communications have been demonstrated. But it may be remarked that these tentacles are undoubtedly hollow, and that in each there is a double channel, that the blood will assuredly pass up one of them and down the other, and that it will oscillate in unison with the movements of the heart. In fact, Van Beneden states that he has seen it do so. I have observed nothing to warrant the belief that either of the channels is in immediate communication with the vascular network of the branchial sac. On the contrary, they both seem to me to open into the pallial plexus, which of course is continued into the wall of the inhalant tube.

The blood-system does not appear to vary much in the Tunicata: though certainly I have not traced it in the other genera so completely as in *Ascidia*, yet enough has been seen to warrant the above assertion. The heart is very similar throughout all the various forms examined; but its position is not by any means constant. In *Ascidia parallelogramma* it is placed on the anterior margin of the stomach, and in connexion with the left side of the mantle or inner tunic, following the removal, in this instance, of the visceral mass from the right to the left side. In *A. intestinalis*, in which there is developed an abdominal chamber, it is doubled upon itself, and lies in this chamber towards the dorsal margin and between the stomach and the bottom of the branchial sac. The heart in *Stycla* is very long, and narrower than usual; in this form it lies between the inner tunic and lining membrane on the left, and a little way from the posterior extremity of the mantle, following the curvature of, but at some little distance from, the alimentary tube. The posterior extremity opens into the dorsal branchial channel a considerable way up the endostyle; the ventral extremity is attached to the stomach, to either side of which it gives a branch in the usual manner. In *Pelonaia* the heart is likewise in connexion with the left side of the mantle, and in other respects resembles the arrangement in *Stycla*. And in *Molgula* it holds much the same situation—but is placed between the reproductive mass which is above it, and a hollow cylindrical body with hard walls, the nature of which is not understood.

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* Mémoires sur les Animaux sans Vertèbres, pt. ii.

† *Op. cit.* p. 113.

The branchial sac is usually more complicated than is generally supposed. Hitherto its mechanism has been spoken of in this communication only so far as was necessary to the full comprehension of the blood-system; it is now time to say something respecting its more minute structure. In all the Tunicates there must of necessity be present the two great branchial or thoracic channels (the dorsal in connexion with the endostyle, and the ventral at the opposite side of the thorax), even when the branchial sac is only partially or not at all developed; and in every instance where a true gill is present, the transverse channels or primary vessels must also exist. These latter may be considered the essential or elementary parts of the respiratory organ; the minute details, consisting of secondary vessels, are variable, even in very closely allied species, and are not always present.

The simplest form of the organ that occurs in the genus *Ascidia* is found in *A. venosa*. In this species the transverse or primary vessels, or channels, are placed at regular intervals, and scarcely vary at all in size; and between and opening into them at right angles are numerous small, longitudinal, secondary vessels divided by elongated spaces or stigmata; so that the whole forms a reticulation of vessels, in which the transverse channels are large and distant, the longitudinal ones small and numerous and divided only by narrow open spaces. Or the structure may be described, for convenience, as it frequently is, as a vascular membrane with large transverse channels and minute longitudinal ones connecting the former, and divided by narrow elongated stigmata. This is the true aerating surface of the gill; and were there no additional appendages, the organ would appear to be composed of numerous transverse series of short longitudinal vessels and narrow openings, divided by large transverse channels or vessels; it would appear to be, in fact, what it essentially is. But on first inspection, with the aid of a low magnifying-power, it seems to be formed of a comparatively coarse reticulation of longitudinal and transverse vessels of nearly equal size, crossing each other at right angles, and having four or five narrow longitudinal openings or stigmata in each square mesh, dividing as many minute vessels.

This appearance is produced by the existence of a number of stout so-called longitudinal vessels or bars that extend from one end to the other of the branchial sac, and project considerably from the inner surface of the organ, to which they are attached only at the points where they cross the transverse channels. Here they are supported upon short wide pedicles, through which they receive their supply of blood from these channels; they are thus lifted some little distance above the general surface of the gill. At these points the longitudinal bars are a little enlarged, and have on their upper margin a stout elongated papilla with the extremity rounded. There is thus a papilla at the angles of each mesh; and they are all inclined towards the ventral side of the respiratory sac, and have on the upper surface, and in front, an elongated disk, which is apparently ciliated.

The walls of the longitudinal bars are comparatively thick; and hence these organs have a certain degree of rigidity. It is not very easy to determine of what use they are; but perhaps their chief function is to protect the more delicate tissue of the true aerating vascular surface; while the papillæ will conduce to the same end, and by the aid of their cilia probably sweep the sedimentary matters towards the oral lamina, the water being beat through the stigmata by the cilia that fringe their borders. From the stiffness of the bars themselves it may be inferred that they will also give support to, and keep stretched out, the vascular network of the sac. They seem ill calculated, on account of the thickness of their walls, to give much assistance in aerating the blood, and are certainly unnecessary as part of the circulatory mechanism.

The blood, as we have already seen, is brought to and taken from the aerating reticulation by the dorsal and ventral branchial channels, and by numerous suspenders connecting it with the visceral and pallial plexuses. We have also traced the blood through the principal channels of the organ from one side of it to the other. All, therefore, that remains to be done is to follow the flow of the stream through the minute portions of the structure.

The extremities of the heart, we have seen, do not open into the ends of the two great branchial channels, but a considerable way above their lower terminations. It is consequently evident that the blood will move upwards in these channels above the point where it enters, and downwards below it; and when we consider the action of the current so brought to the transverse channels, it is clear that the flow will be in contrary directions in the small longitudinal or secondary vessels above and below this point. Now it has been already stated that on the reversal of the action of the heart there is a pause of a second or two, so that for this period the currents cease to move and the fluid becomes perfectly stagnant. On resuming its function, the first act of the heart is to dilate; consequently, the blood is drawn towards it from the respiratory organ; and it follows, as a matter of course, that the fluid in the secondary vessels above the point just alluded to in the great branchial channels must flow downwards, and in those below this point upwards. This will be the case whether the blood is brought to the branchial sac by the dorsal or the ventral channel. Such downward and upward set of the blood-current in the secondary vessels has actually been observed in *Perophora* by Dr. Lister, who states that "the horizontal vessels were connected also by the smaller or vertical channels between the spiracles—the set of the current in the latter being upwards for the two lower rows, and downwards for the two upper rows." If the heart in the first instance threw the blood into, instead of drawing it from, the gill, the reversal of this motion would take place; namely, the flow in the secondary vessels above the point indicated would be upwards, and downwards below it.

Such are the characters of the branchial sac as seen to exist in *A. venosa.* The minute network, however, is not continuous throughout the whole organ, but is interrupted in such a manner as to show that it is composed of two lateral lobes or laminæ. It is divided along the dorsal line by two parallel folds of the lining membrane, which are separated by a deep groove; the tissue at the base of each fold is stiffened by a flattened rod of a somewhat rigid, opake, yellowish substance, which together form the endostyle, that lies, as it were, in the bottom of the groove, along which the rods appear to be united. The upper extremities of these folds diverge right and left, and become continuous with the lower member of what may be termed the anterior cord or collar—two narrow folds also of the lining membrane that encircle the base of the respiratory tube, a little above the anterior margin of the branchial sac, and having the circular blood-channel, previously mentioned, immediately below them. The ventral margin of the sac is furnished with a wide, longitudinal, delicate, membranous fold, which apparently also originates in the lining membrane, and which interrupts the continuity of the minute network in this direction. This is the ventral or oral lamina; it extends from end to end of the branchial sac, and is ribbed transversely; the margin is entire. The mouth opens close by its left side, about one-third from the lower extremity; the upper extremity for some little way downwards is divided longitudinally, showing that the lamina is really composed of two lateral membranes; and each division is united to the lower member of the anterior collar, much in the same manner as the latter is attached to the dorsal folds connected with the endostyle. The upper member of this collar is divided from the lower by a narrow groove, and is uninterrupted by either the oral lamina or the dorsal folds. The oral lamina is connected below by another narrow cord to the posterior extremity of the dorsal folds: this is the posterior cord.

In this way are traced the boundaries of the two lateral laminæ composing the branchial sac. They are attached by their upper borders to the walls of the pallial or respiratory chamber, a little below the anterior collar or cord; the dorsal margins are attached along the sides of the endostyle, and the lower margins along the line of the posterior cord. In all other parts the two lobes are free, except at the points where the suspenders bind them to the walls of the chamber, and where the extremity of the œsophagus penetrates the branchial sac; and here, of course, the latter is attached to the alimentary tube. The supposed function of the endostyle has been already indicated; the folds of the lining membrane to which it is adherent are no part of the gill; neither can the oral lamina be considered a portion of the breathing-organ: it is certainly highly vascular; that is, minutely ramifying blood-channels can be traced in it; but similar vessels (or channels) are seen in all the membranes of the organism, and also occur in the dorsal folds in connexion with the endostyle. The office of the oral lamina is to conduct the food to the mouth. And it has already been stated that the sedimentary matters are there accumulated and formed into a cord, and so carried to the oral aperture along the lamina. The anterior cord may perhaps also aid in collecting sedimentary aliment, if it be ciliated, as its homologue in *Salpa* is stated by Professor Huxley* to be.

The simple form of gill above described is not by any means constant in *Ascidia*; in fact it seems but rarely to occur in this genus. The same simplicity of structure, however, is found in *Pelonaia*, with only some unimportant changes. In *Clavelina* and *Perophora* the vascular network is not more complicated; and in the former, at least, the longitudinal bars have entirely disappeared. And in it there are numerous transverse laminæ which are adherent throughout to the walls of the transverse channels; they are united to the filaments of the oral lamina, and perhaps are mainly instrumental in carrying the food in that direction. The structure of the gill is equally simple in the compound Tunicates; and in them the longitudinal bars seem to be occasionally present.

In *Ascidia mentula* and *A. sordida* the branchial network is fundamentally the same as in *A. venosa*; but in the two former, and in some others, it is minutely folded longitudinally, so that, on making a transverse section of it, the edge presents a deeply undulated line. The surface is not altogether unlike corduroy; it is, in fact, finely plaited (or crimped, as the laundress might say); but the flutes or grooves between the ridges or plaits are interrupted wherever the transverse vessels cross them, the vessels at these points filling up the hollows. Thus there are numerous septa formed, turning the grooves into series of minute recesses or pouches.

The longitudinal bars are strong and raised considerably above the inner surface in *A. mentula*; and there are smaller intermediate papillæ, as well as larger ones at the points where the bars cross the transverse vessels. All the papillæ bear ciliated disks; and a wide membrane stretches from the back of the larger papillæ for a considerable way along the transverse vessels. In *A. sordida* the bars are likewise strong; but the papillæ are rather small, and there are no intermediate ones. Between the longitudinal bars there are two oval ciliated disks, one on either side of the middle line of the transverse vessels.

The oral lamina in *A. sordida* is a wide plain membrane; but in *A. mentula* it is strongly ribbed transversely; the ribs passing beyond the margin as fine points give to it a pectinated appearance.

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* "Observations upon the Anatomy and Physiology of *Salpa* and *Pyrosoma*," Phil. Trans. 1851, pt. 2. p. 567.

In *Stycla tuberosa* and its immediate allies we have another modification of the branchial network. In them it is provided with eight simple longitudinal folds or laminæ—four on each side of the oral lamina; these stretch from one end of the sac to the other, and terminate below by the sides of the oral orifice. The network is, in other respects, as simple as it is in *A. venosa*, there being no minute plaiting such as is seen to exist in *A. mentula*. The folds, however, give to it a very interesting character, inasmuch as we observe in them a very ready and efficient mode of increasing the aerating surface, as, indeed, the same end is gained by the minute plaits in the vascular network in *A. mentula* and *A. sordida*. In *Stycla* the folds are formed in exactly the same way as those minute plaits; that is, they are each composed of a fold of the branchial sac, and the space within is divided into pouches by septa situated at nearly equidistant points. In this genus the transverse vessels vary considerably in size, there being usually one or two smaller between larger ones; and the septa are placed wherever the latter cross the structure. Thus a series of pouches of nearly equal size occupy the interior of the folds, and open at the outer surface of the branchial sac into every part of the atrium. In fact, we see here an arrangement very similar to that observed in the interbranchial water-channels in the Lamellibranchs; and in this case, as in them, the purpose is to allow the water, after permeating the walls of the fold or lamina, to escape externally.

The longitudinal bars in *Stycla* assume the form of delicate ribbon-like membranes attached by one edge to the principal transverse vessels; they are numerous, and are found on the folds as well as on every other part of the organ. The oral lamina is a wide simple membrane.

The branchial sac in *Molgula conchilega* and its allies is characterized by longitudinal folds or laminæ, formed much in the same way as those in *Stycla*. In the former there are six such folds on each side of the sac. The vascular network, however, is very different, having the secondary vessels, or those which are usually arranged at right angles to the transverse channels, disposed in imperfect spiral coils or convolutions, the vessels themselves frequently intercommunicating; consequently the stigmata or open spaces separating them are broken into various lengths. There are also a few delicate radiating vessels which pass from the centre of the coils to the circumference, but mostly in the direction of the transverse channels that convey the blood to and from the coils. The chief purpose of these radiating vessels is apparently to prevent engorgement of the coil, and to aid the reflux of the stream by conveying the blood in the most direct manner to and from the centre of the coil. When the spiral arrangement is more imperfectly developed than usual, the radiating vessels are very irregularly dispersed; but even in such cases there can be little doubt that their function is as above stated. The longitudinal bars have the ribbon-like character of those in *Stycla,* and are principally confined to the folds.

Ascidia parallelogramma has also the secondary vessels spirally arranged, as originally pointed out by Mr. Alder*; and here the coils, which form slight conical eminences, are disposed in regular transverse series between the transverse channels. The coiled vessels do not so frequently intercommunicate as they do in *Molgula*; consequently the stigmata are much longer, being less interrupted. The radiating vessels are not numerous, and they pass from the centre of the coil to the transverse channels. The longitudinal bars are more rigid and cord-like than usual; they project considerably from the surface of the gill; and the papillæ which are attached to them are not elevated, but inclining backwards are united throughout their length, and give support to wide membranes that extend from the surface of the transverse vessels. In this species the oral lamina is replaced by a series of well-developed filamentous processes.

The most perfect, however, of the spiral type of gill is found in *Molgula arenosa.* In this interesting species the interior of the branchial sac is furnished on each side with six or seven wide, longitudinal, ribbon-like bands, which are attached by one edge to the transverse vessels at the points where they cross them. These bands, how like soever in general appearance, are not to be confounded with the branchial folds in *Stycla* and *Molgula*; they are the homologues of the longitudinal bars so constantly present, and with the transverse vessels give to the surface a coarse reticulation, the square meshes of which are each occupied by a conical eminence. On account of the prominence of the longitudinal bands these eminences, which look like so many miniature beehives, seem to be arranged in six or seven longitudinal series. Each cone is formed of a double spiral coil of secondary vessels united at the apex; the coils are perfect, and the stigmata, which are coextensive with them, appear to be scarcely, if at all, interrupted by intervascular communications. Radiating vessels, however, which are sufficiently numerous to prevent engorgement, pass from the apex of each cone to the transverse vessels, and are the principal interruptions to the continuity of the spiral stigmata. The oral lamina in this, as in all the members of the genus, is a plain simple membranous band.

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* "Observations on the British Tunicata," Ann. & Mag. Nat. Hist. S. 3. vol. xi. p. 158.

All the simple Ascidians that have come under my notice, not even excepting *Pelonaia*, have a collar of tentacular filaments situated at the base of the incurrent tube, some distance above the entrance of the branchial sac; indeed the distance in some species is considerable, and no instance has occurred in which they could be said to be connected with the gill. They are usually linear or slightly conical, and are rather numerous, except in *Pelonaia*, which has not more than twelve or fourteen; but in *Molgula* and in some of the other *Cynthiadæ* they are branched or pinnate, and are not very abundant. They, however, all agree in being soft, delicate, hollow organs; and the simple ones ,at least, have the interior divided by a septum into two longitudinal channels, so that the blood will circulate freely through them. They appear to be an outgrowth of the lining membrane, and are supplied with blood from that which flows between it and the mantle or inner tunic.

That enigmatical organ the branchial tubercle (the anterior tubercle of Savigny) is situated in the space between the tentacular filaments and the anterior margin of the branchial sac, in contact with the upper membrane of the anterior cord or collar, and immediately in front of the upper extremity of the oral or ventral lamina. It is formed of two parallel folds of the lining membrane pressed close together and united at the extremities; they seem but as one fold, and are bent into a loop with the ends turned towards the inhalant orifice, and, inclining inwards, are a little convoluted. Thus the organ assumes a rounded or oval form, rising above the surface to which it is attached as a depressed compact tubercular swelling. An opaque white line marks the separation of the two folds, and follows the convolutions to the extremities.

This is the form that this curious tubercle assumes in *Ascidia scabra*, *A. affinis*, a closely allied species, *A. mentula*, and *Pelonaia corrugata*. In *A. sordida* one of the extremities turns inward, the other outward, so that both are bent in the same direction. But more striking modifications occur in some other species. In one allied to *A mentula* there are three loops, crowded upon each other, and having their extremities only slightly incurved; and in another closely related form the organ is dense, large, and somewhat quadrangular, with numerous irregular convolutions formed apparently of several loops of the lining membrane. In *Stycla tuberosa* and *S. mamillaris* it is large, oval, and disk-like, with the extremities so indistinct as to be scarcely traceable. The reverse of this is the case in *Molgula conchilega*, in which it is almost crescent-formed, with the extremities very obvious and well turned inwards. And in *Ascidia venosa* it is still more simplified, being a mere horseshoe-like loop, with the extremities pointed and very slightly incurved.

It is not easy to assign a function to this peculiar organ—though, from its position at the entrance to the branchial sac, it may be inferred that it is of the nature of a special sense, testing the quality of the inhaled water. Taste could be of little use to an animal that has not the power of selecting its food; but it would seem necessary for the creature to be warned of the approach of aught deleterious in the respiratory currents. The function of this organ is therefore probably more akin to that of smell than of taste. It is certainly of some importance in the economy of the animal; for it is constantly present, and is usually closely associated with the ganglion. In some species the tubercle rests upon the nervous centre; and when placed at a little distance from it, a nerve may generally be traced running towards (and in some instances having all the appearances of supplying) it.

The nervous system is in a very rudimentary condition in the Tunicata. There is but one ganglion; and it is invariably placed between the two respiratory tubes, in a blood-sinus situated between the inner tunic and lining membrane, which sinus, communicating directly with the great ventral channel of the branchial sac, will be well supplied with aerated blood. The ganglion is fusiform, more or less elongated in the antero-posterior direction, and usually a little constricted in the middle, as if composed of two centres. In *A. mentula*, and in several other species that have been examined, it is partially folded in a much folliculated gland-like substance, and gives off from each extremity three or four nerves, all of which go to the respiratory tubes and to the adjacent portions of the inner tunic or mantle. A branch from one of the principal nerves has been traced to the branchial tubercle in one or two species. There is no variation of any consequence in the nervous element in any of the forms examined.

The organization of *Salpa* is highly instructive; for in this form we have a Tunicate in which development has been arrested, and which, to a certain extent, has an embryonic character. In it the branchial sac is entirely absent, and the circulatory system is much in the same condition as it is in the young of *Ascidia* before the respiratory organ is developed.

In *Salpa* the outer tunic or test appears to be quite free from the inner tunic or mantle, except at the margins of the anterior and posterior orifices, where they seem to be united. The inner tunic and lining membrane, or that which forms the inner wall of the respiratory cavity, are, on the contrary, adherent throughout, spaces only being left for the passage of the blood-currents; for it is between this tunic and membrane that the "sinus-system" is situated. The respiratory cavity corresponds pretty accurately to the pallial chamber of a simple Ascidian—were the branchial sac entirely removed, leaving only the endostyle with its two lateral folds, the ventral or oral lamina, and the connecting cords.

On examining the great respiratory chamber or cavity in *Salpa spinosa*, for instance, an endostyle with the two lateral membranous folds, similar in all essentials to that organ in the other Tunicata, is seen adhering to the dorsal wall of the cavity; and the so-called "branchial band" or "gill" is conspicuous on the opposite side, passing forward from the nucleus in an inclined position, the posterior extremity being attached in the vicinity of the mouth, the anterior to the ventral wall of the cavity. The two folds in connexion with the endostyle and the "branchial band" are connected in front by a narrow band (the "ciliated band" of Huxley) that encircles the anterior extremity of the respiratory cavity: and another similar band, or pair of parallel bands, passes from the posterior end of the dorsal folds, and terminates near to the posterior extremity of the "branchial band." Thus we observe certain lines or bands which, together with the endostyle, correspond to the boundary lines of attachment of the branchial sac of a simple Ascidian; and if we suppose a vascular network extended from either side of the endostyle to the lateral margins of the "branchial band," and imagine it to be attached in front and behind along the ciliated bands, we shall see how readily a Salpa may be made to assume the most striking feature of an ordinary Ascidian.

Now the ciliated bands are the homologues of the posterior cord and the lower member of the anterior cord or collar of the branchial sac of the simple Ascidians; and the "branchial band" is the equivalent of the oral or ventral lamina of the same group. The relation of the ciliated bands, particularly the anterior, to the "branchial band," and the characters of the latter, sufficiently prove this.

The so-called branchial band has the appearance of a cylindrical tube; but it is easily seen that it is formed of two laminæ, the lower or ventral margins of which are a little separated, while the upper or dorsal are brought together, forming a ridge along this margin. A large blood-channel runs along in connexion with, and immediately below, the ventral margins; this is the homologue of the ventral branchial channel. The two laminæ rise, as it were, from the sides of this channel, and inclining towards each other, are united along the dorsal ridge as just stated; but towards the anterior extremity of the organ they separate, and become united to the ends of the ciliated cord or band in exactly the same way as the lateral divisions of the oral lamina join the anterior cord or collar. In fact, in both *Salpa* and *Ascidia* the one organ seems to be a continuation of the other, as they are, no doubt in both, productions of the lining membrane, the blood-channel itself being developed in connexion with the same membrane. The "branchial band," we thus see, corresponds to the oral lamina in being composed of two laminæ, in its relation to the anterior ciliated band or collar, and in its connexion with the great ventral blood-channel. And, moreover, like the oral lamina in several of the *Ascidiæ*, it is transversely ribbed. In *Salpa* the ribs are stout and strongly ciliated; and there can be no doubt they are also ciliated in *Ascidia*.

In *Salpa*, then, the so-called branchial band cannot be looked upon as a true gill; and homologically it does not represent the branchial sac at all, but only that appendage of it the oral lamina. And as the function of the latter seems to be chiefly, if not exclusively, to carry the food to the mouth, the same office is probably performed by the so-called gill in *Salpa*. And, indeed, without some such help it is difficult to see how such an animal would be able to take its food. There can be little doubt that the walls of the respiratory cavity, as has been suggested by Professor Huxley*, chiefly effect the decarbonization of the blood; while the so-called gill will aid in this operation in proportion to its vascularity; as must, indeed, all the tissues bathed by the respiratory currents.

The ganglion lies on the ventral side of the respiratory cavity, between the lining membrane and inner tunic, a little in advance of the ciliated band, and directly in front of the anterior extremity of what we may now term the oral lamina (the pseudo-gill). All the nerves are given to the walls of the cavity—in other words, to the inner tunic or mantle. The anterior extremity of the ganglion is produced a little, giving an appearance to the organ as if composed of two centres. On the anterior surface of the produced extremity there are three or four imperfectly formed black pigment specks, having the appearance of rudimentary eyes, which, however, Professor Huxley considers auditory capsules.

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* *Op. cit.* p. 570.

The "languet," with its ciliated "fossa," is placed just in front of the ganglion, consequently on the same middle ventral line with it and the oral lamina; it is a long, tapering, conical process, with a longitudinal groove which widens at the base where it joins the fossa, over which it seems to straddle. There can scarcely be any doubt that this is an organ of special sense; and it would appear probable that its office is to ascertain the quality of the respiratory currents, and may therefore be olfactory. Thus in function the "languet" would seem to agree with the branchial tubercle so constant in the other Tunicates; but it is, moreover, homologically speaking, the same organ, as appears demonstrated by its position in relation to the ganglion, the ciliated band, and the pseudo-gill. Like the tubercle, too, it is a production of the lining membrane; and, as indicated by the longitudinal groove, like it, also, the "languet" is probably formed of two portions or folds of this membrane. It must, therefore, not be confounded, as it frequently has been, with the tentacular filaments of the oral lamina in *Clavelina*, *Pyrosoma*, and several other simple and compound Ascidians.

The homologies, however, do not stop here; the clear anastomosing vessels or tubes ramifying over the surface of the intestine, described and figured by Prof. Huxley*, and supposed to "represent a hepatic organ," or "a sort of rudimentary lacteal system," are, there can be no doubt, the homologue of the rudimentary liver before described in *Ascidia* and in some of the Cynthiadæ; and, indeed, the structure appears to resemble very closely that of the hepatic organ in *Ascidia parallelogramma*. The "mass of clear cells," the "elæoblast" of Krohn, according to Huxley, may perhaps prove to be the same as the well-known cell-structure before described as coating the alimentary tube in the *Ascidiæ*; but this is mere conjecture.

Thus we see how close the relationship is between *Salpa* and *Ascidia*; with *Clavelina*, however, the connexion is still more intimate. This is undoubtedly a near ally; it is only necessary to look to immature specimens to be satisfied of this. When the young *Clavelina* is about one twentieth of an inch long, and when the thoracic portion would scarcely be half that length, the thorax is remarkably like the embryo of *Salpa*. In profile both have a subtriangular form, the anterior opening being placed at the angle in front, and the posterior at an angle situated considerably backward, the young of *Clavelina* having the two orifices nearly as far apart as they are in the embryo of *Salpa*. At this early period of growth the endostyle is distinctly developed in both forms, and the ganglion and the oral lamina are clearly indicated, also the ciliated band or anterior collar. So far, everything is alike; the general similarity of the respiratory cavity is obvious enough; and were the nucleus in *Salpa* produced a little more than it is backwards, the resemblance of the two would be almost complete. But in the young of *Clavelina* there are, in addition to what has already been described, the tentacular filaments of the incurrent tube, which are now of considerable size; and the branchial sac has already commenced its development.

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* *Op. cit.* p. 570.

The latter organ, however, is in an exceedingly rudimentary condition: only a single transverse channel or primary vessel on each side of the great ventral channel has made its appearance, and does not yet extend much more than halfway across the thoracic or respiratory cavity, on its way (so to speak) to the dorsal channel in connexion with the endostyle. On each side of these growing primary vessels five or six secondary vessels, at right angles to them, have commenced to sprout; and the distal extremities of all of them, as well as of the primary vessels themselves, open through the lining membrane of the thoracic cavity into the sinus-system between it and the inner tunic. Thus is defined, on either side, the nascent atrium, which is only an extension of the cloaca that had been previously formed. Shortly another primary vessel makes its appearance, extending from the ventral channel and connected laterally with the extremities of the secondary vessels already formed; and then another series of secondary vessels is developed, and afterwards another primary vessel, and so on, gradually increasing the length of the two branchial leaflets (if they may be so called), which at the same time grow in breadth, passing further and further across the thoracic cavity until at length they reach the sides of the endostyle; all the while the primary and secondary vessels along the margins of the growing organ, open into the pallial sinuses in the manner already indicated; so that the boundary of the water-space or atrium is well defined, and is always coextensive with the expanding gill. The oral processes, which in this animal occupy the place of the lamina, are produced one by one, in accordance with the appearance of the primary vessels; and the vascular suspenders likewise originate at the same time.

It is unnecessary on this occasion to trace the development of the branchial sac further, or with more minute details; it should be observed, however, that the growth of the gill undoubtedly originates in the great ventral channel, which is itself a production of the lining membrane, and that during the development of the organ it is connected with this membrane, and that this connexion is ever afterwards maintained by the vascular suspenders. It may also be remarked that in no stage of the growth is the gill ever connected, on the one hand, with the margin of the oral orifice—or, on the other, with the tentacular filaments of the incurrent tube, which are, indeed, placed at a considerable distance from the upper margin of the gill; and the lower margin is some way above the oral orifice.

The above description of the development of the gill does not exactly agree with that given by A. Krohn of the branchial sac of *Phallusia* (*Ascidia*) *mamillata**. According to this author, there are at a very early stage of development two excurrent orifices, one on each side of the middle line,—necessitated by the fact that the gill commences to separate itself from the walls of the cavity at two points simultaneously, thus forming two separate water-spaces, one on each side of this line,—the great ventral blood-channel apparently not being yet detached from the inner tunic. It is not till the "branchial sac is everywhere perforated" that these water-spaces, according to this naturalist, are united by the formation of the cloaca. I have certainly not seen the young of *Clavelina* in a sufficiently early stage of development to warrant the assertion that such does not take place in this form; but assuredly in it, at a very early period, the cloaca freely communicates with the water-space or atrium on each side. At the same time it must be allowed that it is more than probable that, at the earliest stage of existence, in *Clavelina* and in other Tunicates the great ventral channel is united throughout to the wall of the pallial chamber; and hence the statement of Krohn does not seem at all unlikely. And, moreover, we thus learn that this great blood-channel is developed in connexion with the lining membrane, with which it continues ever afterwards more or less connected. We have already seen that the transverse or primary vessels take their origin in this same vessel, and that they in their turn give off the secondary vessels: these are the essential parts of the branchial tissue; and when we look to its anatomical structure as well as to its mode of growth, we can scarcely doubt that the network of the gill is truly vascular. Speaking, therefore, of the branchial sac as a perforated membrane, as is frequently done, gives an erroneous idea of its apparently true nature.

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* "On the Development of the Ascidians," by A. Krohn—'Scientific Memoirs', edited by Henfrey and Huxley, 1853, p. 324.

The longitudinal bars which have been so frequently alluded to, and which lie in a plane a little above the inner surface of the respiratory sac, are non-essential parts of the organ, their function apparently being, as previously stated, to protect the surface of the gill, and, by the aid of their cilia, to sweep the alimentary matters towards the oral lamina. They are not always developed: they do not exist in *Clavelina*; neither are they apparently present in *Perophora*; and they seem to be absent in several of the compound Ascidians; in *Doliolum* they have likewise disappeared.

It is stated above, that *Clavelina* is nearly related to *Salpa*; but *Pyrosoma* and *Doliolum* come much nearer to it in their general structure, as well as in the details of their organization. Unfortunately I have never seen either of these two interesting forms; but, judging from the able descriptions of them by Prof. Huxley in the 'Philosophical Transactions,' they both present examples of imperfectly developed gills. In *Pyrosoma* the secondary vessels are entirely absent, and the primary vessels of the two lateral laminæ of the branchial sac do not reach the endostyle, their development having been arrested before they extended so far across the respiratory cavity; their distal extremities, however, will undoubtedly open into the system of pallial sinuses; in no other way can the flow of the blood through the gill be explained: the circulation is therefore to this extent embryonic. "The longitudinal bars" of Huxley are the homologues of what have been so designated throughout this communication, and are therefore not to be confounded with the true vascular portion of the gill. To turn *Pyrosoma* into a *Salpa*, little more seems necessary than to arrest entirely the growth of the primary branchial vessels, and to give to each individual a separate test.

An arrest of development of these vessels is carried to a much greater extent in *Doliolum*. In this form the secondary vessels have not only disappeared, but the longitudinal bars are also absent, and the primary vessels themselves only very imperfectly developed. The two bands named by Huxley respectively the "epipharyngeal" and "hypopharyngeal" in this curious form, undoubtedly indicate the line of the great ventral channel and oral lamina, bent up in accordance with the peculiar development of the creature. In the *Ascidiæ* that have the branchial sac prolonged behind the mouth, the ventral channel extends likewise behind the mouth, as well as in front of it; and if we suppose the endostyle to be shortened in these species, and the posterior portion of the sac to be consequently drawn backward and upward, the corresponding extremity of the ventral channel would pass up the dorsal side of the pallial or branchial chamber; and thus this axis of the gill would at once take up the position it occupies in *Doliolum*: that is, part would be above or in front, and part below or behind the mouth; part would form a "hypopharyngeal" band, and part an "epipharyngeal" band.

Now the primary vessels or "tubular bars" originate in the sides of these bands, and are, as already stated, very imperfectly developed, extending, as they do, only for a short distance, and then terminating by opening through the lining membrane of the respiratory cavity into the pallial sinuses, just we have supposed the similar vessels do in *Pyrosoma*. The vessels or "bars," however, of the middle portion of the gill, according to Prof. Huxley, do not so terminate, but end in free loops. The branchial sac is, indeed, in such a rudimentary condition that one step more in its degradation and it would entirely disappear, and *Doliolum* would be scarcely distinguishable from *Salpa*.

In *Appendicularia* the gill is wholly absent; but the oral lamina is represented by the "ciliated band," which adheres to the ventral surface of the respiratory cavity; and it is interesting to find that the anterior extremity of this band divides into two branches, which, passing towards the dorsal region, encircle the cavity a little below the ganglion, just as the anterior ciliated band does in *Salpa*, as the anterior band or collar does in *Ascidia*.

In this interesting form, in which the embryonic characters have become permanent, we see the oral lamina still adhering to the wall of the respiratory cavity, as well as the endostyle and anterior collar or ciliated band. All these parts, then, appear to be equally developments of the lining membrane; and the gill, which in the higher forms has been described to originate in the oral band, or rather in the great ventral channel, which always accompanies it, must likewise be considered a production of this same membrane, and which, too, we have seen it is connected throughout its development.

It is not my intention, on the present occasion, to enter at any length on the relation that subsists between the Tunicata and the Polyzoa on the one hand, and the Tunicata and the Lamellibranchiata on the other. Nevertheless it seems desirable to say a few words on this important branch of the subject before concluding, with the view merely of indicating what appears to be the result, in this respect, of my recent investigations.

That the Polyzoa are very closely allied to the Tunicata is now generally admitted; opinion, however, is divided respecting the homology of the tentacular crown—some naturalists maintaining that it is represented by the branchial sac, while others believe that it is homologous with the tentacles of the respiratory tube, and that the branchial sac is really the dilated pharynx of the polyzoon. These two views have been ably advocated respectively by Prof. Allman and Prof. Huxley.

In my paper on the "Freshwater Bryozoa," before cited, the opinion that the branchial sac is homologous with the tentacular crown was maintained; but my belief in this view has been of late much shaken, and even Prof. Allman's ingenious explanation of his theory seems to me no longer satisfactory. The peculiar idea entertained by this able physiologist is, that the lophophore of a Hippocrepian Polyzoon is the homologue of the ventral branchial channel of the Ascidian, and that the tentacles of the former correspond to the transverse or primary vessels of the branchial sac. But the lophophore is an appendage of the mouth, and is developed from the margin of the oral orifice, and therefore can scarcely be considered to be the true representative of the branchial channel, which does not seem to be so related, but appears rather to be developed in connexion with the lining membrane coating the pallial cavity, and has all the appearance of a true vessel in direct communication with the heart. And there are other difficulties in the details of this view, to which it is unnecessary, at this moment, to make further allusion.

The view so forcibly advocated by Prof. Huxley seems to rest more upon a wide and philosophical generalization of Molluscan organization than on anatomical and embryological data, and is therefore difficult to discuss from a standpoint of the details of such matters. It must, however, be stated that the anatomical facts, so far as I have been able to examine them, do not seem to contradict this hypothetical view; indeed, in many respects, they appear rather to support it. The anatomical data, nevertheless, will, I think, bear another interpretation, which, perhaps, it will be well to consider, merely premising that I have no wish to support it further than as a suggestion which has a few corroborative facts in its favour: more information is still required before this matter can be determined satisfactorily. The interpretation alluded to is, that the branchial sac is a new and distinct development, as the endostyle is, and as are the oral lamina, the branchial tubercle, and the tentacular filaments of the inhalant tube,—and that all these organs have equally their origin in the lining membrane or inner tunic of Huxley, and have no homological representatives in the Polyzoa.

And, further, this interpretation of the facts leads to a belief that the branchial sac is the rudiment of the Lamellibranchiate gill, the structure of the two organs being essentially the same. The principal blood-channels in the gill of the Lamellibranch are simple transverse vessels; and the most persistent and essential parts in the structure of the branchial sac of the Tunicates are the transverse or primary vessels. Thus, fundamentally, these organs are similar. And when the branchial sac is furnished with longitudinal folds, as generally is the case in the Cynthiadæ, the primary vessels assume relatively the same position as their supposed homologues do in the gill-plate. The folds, too, as the nature of the structure implies, are formed of two laminæ united at their distal margins, and have the space between them divided by septa into transverse pouches, which only want to be elongated by the further development of the fold to make them correspond in every respect to the interbranchial water-tubes of the gill-plate of the Lamellibranch. And already the pouches subserve the function of water-tubes.

Now we have seen that the branchial sac is composed of two lateral laminæ, originating in the great ventral channel, and extending to the endostyle; and in *Pyrosoma* and *Doliolum* we observe that these laminæ are curtailed in their development before they reach so far; in the latter, in fact, they are exceedingly limited. There is, therefore, no difficulty in supposing that the branchial sac might be reduced to merely four such folds as above alluded to, two being on each side of the mouth and oral lamina. Were such the fact, there would be four rows of orifices, corresponding to the pouches in the folds on the outside of the gill, opening into the cloaca, exactly like the four rows of openings of the interbranchial water-tubes communicating with the anal chamber in the Lamellibranchs. Thus, in all external characters, we should have here a very complete representation of the four gill-plates of that group. Each pair of the gill-plates, however, in the Lamellibranchiata has its own proper efferent blood-vessel leading directly to the heart; while our supposed transformed organ has only one such trunk vessel. It would therefore seem probable that the branchial sac can represent but a single gill of the Lamellibranch, and that one fold on each side of the ventral lamina (or great ventral channel) may be assumed to be the homologue of the left gill of the higher mollusk.

The branchial sac itself is not a perfectly symmetrical organ; at least the oral lamina does not exactly divide it into two equal lateral halves; for it invariably passes to the right of the oral aperture in all dextral species, and it never, so far as my observations extend, abuts directly upon it. On the other hand, the heart in the simple Ascidians usually occupies a central position, being placed in the middle line of the digestive organs; and the great vascular trunks as they leave its anterior or ventral extremity, exhibit a symmetrical bilateral development, a trunk going to each side of the visceral mass, and there ramifying over these organs. That, however, on the left side sends a large branch along by the side of the intestine to the great ventral channel of the gill; while the corresponding branch of the right side dies out before reaching the opposite margin of the visceral mass. Here, then, ceases the bilateral symmetry of the vascular organs; were it carried a little further, there would exist two ventral branchial channels; and thus a right pair of gill-plates might be developed, one fold being on each side of the channel; and in this way the respiratory organ would be exactly similar in all essential characters to that of a Lamellibranch. And if the roots of the two lateral trunks that proceed from the heart were dilated into auricles, the rudiments of the Lamellibranchiate heart would also be established. This idea of an arrest of a bilateral growth is somewhat strengthened by Krohn's description, already quoted, of the development of *Ascidia mamillata*, in which the young at first has two distinct lateral atrial spaces and two lateral excurrent orifices; the spaces ultimately coalesce, as do also the orifices, the tendency to bilateral development terminating at a very early period.

If this view of the homologies of these organs be correct, then the cloacal, or that which has been uniformly designated throughout this communication the ventral surface, will correspond to the dorsal region of the Lamellibranch; and consequently the opposite margin will be the ventral aspect, and the so-called right and left sides will have to interchange appellations. Thus the excurrent tube will become dorsal, and the incurrent ventral, as they are in the Lamellibranchiata, and, without any great disturbance of the parts, all the viscera will assume their proper positions.

Before the probability of this determination of the homological relations can be admitted, it is necessary to ascertain the true nature of the ganglion, which, as we have seen, is placed between the respiratory tubes. In the Polyzoa the ganglion is placed on the rectal aspect of the œsophagus, immediately below the mouth, and gives its nerves to the tentacles and to the œsophagus in the direction of the mouth, but none to the "endocyst" (mantle) or to any other organ. Therefore it can scarcely be homologous with the ganglion in the Tunicata, which distributes all its nerves to the walls of the respiratory tubes (which are mere prolongations of the mantle) and to the mantle itself. In the Lamellibranchs, however, there is a ganglion (or a pair of ganglions), namely the branchial, the most constant in these animals, situated upon the posterior adductor muscle, which, besides supplying the gills, gives nerves to the dorsal portions of the mantle and to the respiratory tubes, parts which are the undoubted homologues of those which receive the nerves from the ganglion in the Tunicata. It therefore seems impossible to avoid the conclusion that the ganglion in the latter is the true representative of the branchial ganglion in the Lamellibranchiata: ganglia supplying homologous parts must likewise be homologous.

This determination of the nature of the ganglion agrees well with its position, which in relation to the respiratory tubes is almost precisely similar to that of the branchial ganglion. And we thus find in the nervous element a corroboration of the above suggestion as to the homological relation of the branchial sac.

Notes on some Insect- and other Migrations observed in Equatorial America. By Richard Spruce, Esq. Communicated by the President.

[Read June 6, 1867.]

In endeavouring to trace the distribution of plants in the Amazon valley, and to connect it with that of animals, I have been struck with the fact that there are certain grand features of the vegetation, which prevail throughout Cisandine America, within the tropics, and even beyond the southern tropic,—features independent of the actual distribution of the running waters, partly also of the geological constitution, and even of the climate—to which the range of the larger Mammals and Birds corresponds in a considerable degree, but not that of any one class or tribe of animals, and especially not of lepidopterous Insects. These features depend on the prevalence of certain groups, or even of single species, of plants over vast areas:—one set prevailing in the Virgin or Great Forests (*Caa-guaçú* of the Brazilians, *Monte Alto* of the Venezuelans) which clothe the fertile lands beyond the reach of inundations, and constitute the great mass of the vegetation; another in the Low or White Forests (*Caa-tinga*, *Monte Bajo*)—those curious remnants of a still more ancient and humbler but surpassingly interesting vegetation, which (especially on the Rio Negro and Casiquiari) are being gradually hemmed in and supplanted by the sturdier growth of the Great Forests, wherein they are interspersed like flower-beds in a shrubbery; another in the Riparial Forests (*Ygapú* or *Gapó*, *Rebalsa*), on lowlands bordering the rivers, and laid under water for several months in the year, where the trees when young, and the bushes throughout their existence, must have the curious property of being able to survive complete and prolonged submersion, constituting for them a species of hybernation; a fourth in the Recent Forests (*Caa-puéra*, *Rastrojo*), which spring up to replace the Primitive Forests destroyed by man, and, notwithstanding their weedy character, consist chiefly of shrubs and trees; a fifth in the Savannas or Campos—grassy or scrubby knolls, or glades, or hollows (dried-up lakes), which bear a very small proportion indeed to the vast extent of woodland, in the Amazon valley proper, but towards its northern and southern borders compete with the woods for the possession of the ground, and in the centre of Venezuela enlarge to interminable grassy "llanos" or plains.

From an elevated site that should embrace the landscape on all sides to the extreme limit of vision, as, for instance, from the heights at the confluence of the Rio Negro and Amazon, or, better still, from one of the steep granite rocks that overlook the noble forests of the Casiquiari, a practised eye would distinguish the various kinds of forest by their aspect alone. The Virgin Forests are distinct enough by the sombre foliage of the densely-packed, lofty trees, out of which stand, like the cupolas, spires, and turrets of a large city, the dome-shaped or pyramidal or flat-topped crowns of still loftier trees, overtopping even the tallest palms, both palms and trees being more or less interwoven with stout gaily-flowering lianas; the White Forests by the low neat-growing and thinly-set trees and bushes, with scarcely any lianas—the palms few, but peculiar, and often odd-looking,—on a near view by the greater abundance of Ferns, especially on the trees, and sometimes of terrestrial Aroids and Cyclanths; the Recent Forests by their low irregular tangled growth, paler foliage, and general weedy aspect; the Riparial Forests, even where the water is not visible, by the varied tints of the foliage, and by the trees rarely equalling those of the Virgin Forest in height—sometimes, indeed, beginning on the water's edge as low bushes, thence gradually growing higher as they advance inland, until at the limit of inundations they mingle with the primeval woods, and are almost equally lofty,—by the greater proportion of herbaceous lianas which drape the trees and often form a curtain-like frontage,—and by the abundance of Palms, whereof the taller kinds usually surpass the exogenous trees in height, and (the Fan-Palms especially) often stretch in long avenue-like lines along, or parallel to, the shore. On some black-water rivers, such as the Pacimoni, the Atabapo, and the Rio Negro in some parts of its course, the breadth of inundated land is entirely clad with bushes and arbuscules of very equable height, on the skirts of which the Virgin Forest rises abruptly to a height more than twice as great. This is called by the natives "Caatinga-gapó."

Besides these differences of aspect, the natives will tell you there are other more intrinsic ones,—for instance, that the riparial trees have softer and more perishable timber, as well as inferior fruits; while the Caatingas, with a far greater show of blossom, have hardly any edible fruit at all, and very few indeed of the trees rise to the magnitude of timber-trees. And yet, when the constituent plants of the different classes of forest come to be compared together, they are found to correspond to a degree quite unexpected; for, although the species are almost entirely diverse, the differences are rarely more than specific. It is only in the Caatingas that a few genera, each including several species, seem to have taken up their exclusive abode: such are *Commianthus* among Rubiaceæ, *Pagamea* among Loganiaceæ, *Myrmidone* and *Majeta* among Melastomaceæ; and there are a few other peculiar genera, chiefly monotypic. But, of the riparial plants, nearly every species has its congener on *terra firma*, to which it stands so near, that, although the two must of right bear different names, the differences of structure are precisely such as might have been brought about by long exposure even to the existing state of things, without supposing them to date from widely different conditions in the remote past; and this is especially true of such genera as *Inga*, *Pithecolobium*, *Lecythis*, and of many Myrtles and Melastomes, Sapotads, &c.

As an illustration of the features which tend to impress a certain character of uniformity on the vegetation of the Amazon region, I will take the case of a single tree, *Bertholletia excelsa* (H. & B.)—perhaps the noblest tree of the Amazon region, and the most characteristic of its Virgin Forests—and briefly sketch its distribution. In aspect and foliage it is not unlike a gigantic Chestnut-tree; and the seeds (the Pará nuts of commerce), if not much like chestnuts in their trigonous bony shell, are not very different in taste, whence the Brazilian name of the tree (*Castanheira*), and of the seeds (*castanhas*). This tree is found almost throughout the Amazon valley, both to north and south, chiefly wherever there is a great depth of that red loam which it pleases M. Agassiz to call "glacial drift." About Pará itself there is no lack of it, especially in the fine woods of Tauaú; and 1200 miles further to the west it may be seen in some abundance on the very banks of the Amazon, between Coary and Ega, at a part called Mutúncoára (Curassow's Nest), where steep red earth-cliffs border the river and forest; while it extends many hundred miles up the Purús and other southern affluents. North of the main river I have seen it at many points—for instance, in the forests of the Trombetas and at the falls of the Aripecurú, in various places along the Rio Negro, where one village (Castanheiro) takes its name from it, and on the Casiquiari and Upper Orinoco, where it was first seen and described by Humboldt and Bonpland.

A magnificent palm, *Maximiliana regia* (Mart.)—Inajá of the Amazon, Cocurito of the Orinoco—frequently accompanies the *Bertholletia*, and is still more widely and generally dispersed. I have seen it as far to the south as in 7° lat.; and in 5½° N. lat., at the cataracts of the Orinoco, it is still as abundant as on the Amazon. It even climbs high on the granite hills. On one which I ascended near the falls of the Rio Negro, an Inajá palm occupied the very apex, at 1500 feet above the river; and with the telescope I have distinctly recognized this palm at a much greater elevation on Duida and other mountains. Both the tree and the palm range to northward and southward beyond the limits of my own explorations; and there are a few other arborescent plants which stretch all through South America, from the base of the coast-range of Caracas (or even in a few cases from the West-India Islands) to the region of the river Plate; but these are chiefly trees such as sprinkle the savannas, or are gathered into groves, along both the northern and southern borders of the great Amazonian forest-belt, wherein they now barely exist on the bits of "campos" that at wide intervals break the monotony of the woodland—although they probably at some antecedent period ranged continuously from north to south.

In other cases, closely allied species occupy distinct areas. One of the finest fruits of Equatorial America, the Cocura (*Pourouma* of Aublet), is borne in large grape-like bunches on trees of the Breadfruit tribe, having large palmatifid hoary leaves, quite like those of their near allies the Cecropias. Now the Cocura of the mid-region of the Rio Negro, of the Japurá, and of the Upper Amazon or Solimões, is *one* species (*Pourouma cecropiæfolia*, Mart.), while that of the mouth of the Rio Negro and adjacent parts of the Amazon is a very distinct and smaller-fruited species (*P. retusa*, Spruce), and that of the Uaupés is a third species (*P. apiculata*, Spruce), all three being so plainly diverse that the Indians distinguish them by adjective names, although that diversity or divergence, as in a vast many parallel instances, is but a measure of the time that has elapsed since their derivation from a single stirp.

But the most general cause of resemblance lies in this fact, that there are many orders and families of plants whereof many of the species are confined to limited areas, and yet, throughout the Amazon valley, each order, or family, will be everywhere represented by about the same number of individuals and species, having to each other nearly the same correlation, as regards aspect and sensible properties—provided always that the conditions of growth (as above defined) be the same; so that a plant which serves as food for any particular animal or tribe of animals in a given locality, is pretty certain to have its congener (or at least its coordinate) in any other locality of the same region.

The Riparial Plants of the Amazon (such, namely, as grow between ebb- and flood-mark, or within the limits to which the annual inundations extend) range in many instances from the very mouth of the river up to the roots of the Andes; and I do not yet know of a single tree which is not found both on the northern or Guayana shore and on the southern or Brazilian*. The most notable example of this extensive range is the Pao Mulatto, or Mulatto Tree (*Enkylista*, Benth.), a tall elegant tree allied to the Chinchonas, and conspicuous from its deciduous brown bark, which grows everywhere on lands flooded by the Amazon, and, from its accessibility and the readiness with which its wood burns while green, supplies a great part of the fuel consumed by the steamers that navigate the Amazon. It is almost equally common on some of the white-water tributaries; I have seen it, for instance, far away up the Huallaga to the south, and up the Pastasa to the north. Two of the commonest river-side Ingas of the Amazon (*I. splendens*, W., and *I. corymbifera*, Benth.) reappear together on the Upper Casiquiari and Orinoco; and similar instances might be multiplied indefinitely.

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* Hence I suspect that those insects of the south side of the Amazon which have been identified with Guayana species, belong chiefly to the Riparial forests.

Streams of black or clear water have also their proper riparial vegetation, some species being apparently repeated on all of them. For example, many of the trees of the inundated margins of the Tapajoz (some of them undescribed when I first gathered them) I found afterwards on the Rio Negro up to its very sources—although none of them inhabit the shores of the Amazon, either between the mouths of those two affluents or elsewhere. A few recur on the Teffé and other black-water streams entering still further to the west, and even on similar affluents of the Orinoco.

Here, at least, would seem to be a case of the vegetation depending on the distribution of the running waters; but in reality both the kind of water and the vegetation nourished by it depend entirely on the nature of the soil, those rivers which run chiefly through soft alluvial bottoms being turbid, while those that have a hard rocky bed run clear; and the two classes of rivers are repeated over and over throughout the length and breadth of the Amazon region. Into the black Rio Negro runs that whitest of rivers, the Rio Branco, and imparts to the vegetation of the former, for a little way below their confluence, quite an Amazonian character[*]. The two largest tributaries of the Casiquiari, namely the Pacimoni and the Siapa, run nearly parallel through a longish course, and at rarely more than fifteen miles apart; yet the former has clear dark water, and the latter is excessively muddy. Moreover, when I explored the Pacimoni to its very sources, I found it divide at last into two nearly equal rivulets, whereof the one had white and the other black water. The true riparial vegetation in all these, and in hundreds of other cases, is invariably modified after the same fashion by the colour of the waters. How it became what it is, and how it came there at all, are questions not to be discussed here.

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[*] Here, for instance, is the only locality throughout the Rio Negro for *Bombax Munguba*, a fine silk-cotton tree abounding on the Amazon.

After what has been said, it is scarcely necessary to add that many species of plants which grow down to the very coast in Guayana exist also in the Peruvian province of Maynas—that is, at the eastern foot of the Andes, and even up to a height of a few thousand feet in those mountains,—*e. g.* Humboldt's Willow (*Salix humboldtiana*, W.) and the Cannon-ball Tree (*Couroupita guianensis*, Aubl.), called *Aia-uma*, or Dead Man's Head, in Maynas; while the proportion of Orinoco plants repeated on the Amazon is much greater than that of the plants of South Brazil. Nor does this uniformity of character, and the constant recurrence of certain species, preclude the possibility of the flora being wonderfully rich; for I have calculated that by moving away a degree of either latitude or longitude, I found about half the species different; while in the numerous "caatingas" I have explored I always found a few species in each that I never saw again, even in other "caatingas".

The importance of inquiries of this class is obvious, even from a zoological point of view; for that an animal should flourish in any region it must there find suitable food; and there is perhaps no part of the world where so large a proportion of the animals is so directly vegetarian in its diet. I have reason to believe that there is no carnivorous animal on the Amazon and Orinoco which does not occasionally resort to vegetables, and especially to fruits, for food,—not always of necessity, but often from choice. When, however, we come to consider and compare the distribution of the various classes and subordinate groups of animals, we see that the range of a fruit-eating species or tribe can rarely correspond to that of one which feeds on leaves—and similarly of other pairs of differences or contrasts in the nature of the food,—that, in short, the only animals which can be expected to range from sea to sea in a wide continent are a few general feeders and their parasites, the larger beasts of prey, and the scavengers, such as Vultures among birds (and perhaps Termites among insects).

As to the distribution of the Lepidoptera in the Amazon valley, it is plain that it can rarely correspond to the grander features of the vegetation, for the simple reason that the food of caterpillars is scarcely ever the foliage &c. of the loftier forest-trees, but chiefly of soft-leaved undershrubs and low trees (1) which grow under the shade of the forest and have, many of them, a restricted range, or (2) which spring up where the primeval woods have been destroyed, and in waste places near the habitations of men, and whose range in many cases is coextensive at least with Cisandine Tropical

America. The bushy trees and the luxuriant herbs which border savannas and "caatingas" and broad forest-paths, and sometimes those which grow on the very edge of streams, are also apt to be infested by caterpillars. Of about two thousand forest-trees I have had cut down in the Amazon region for the sake of their flowers and fruits, very few indeed have been infested by caterpillars. A tall Leguminose (tree or liana) or Bombaceous species would sometimes have caterpillars on it; more rarely a Laurel or a Nutmeg; but a Fig or a Guttifer never. A vast number of trees and lianas of all sizes are, indeed, excluded from serving as food to caterpillars by their strongly resinous or else acrid and poisonous juices,—and many more on account of their hard leathery leaves, which are untouched except, rarely, by minute caterpillars that eat hemselves galleries in the parenchyma.

Of plants which afford food for caterpillars, Leguminosæ hold decidedly the first place; next to these rank Mallow-like plants (including Malvaceæ proper, Sterculiaceæ, Büttneriaceæ, and Tiliaceæ); then Melastomaceæ and Solanaceæ. Caterpillars armed with stinging hairs seem peculiarly partial to Leguminosæ, as I know to my cost, the bushy Inga trees in some parts being scarcely approachable when with flowers and young leaves. In the neighbourhood of Guayaquil, children that stray under the Tamarind-trees sometimes get severely stung by the hairy caterpillars that drop on them from the trees.

Other orders of plants on which I have encountered caterpillars are chiefly the following. Among ENDOGENS: Grasses, Sedges, Palms, and Aroids—on all rather rarely; on Scitamineæ and Musaceæ more frequently. Among EXOGENS: Euphorbiaceæ (principally on those with aromatic foliage); Samydeæ; Bixaceæ; Vochysiaceæ; Sapindaceæ (few); Malpighiaceæ; Anonaceæ and Myristiceæ (rarely); Anacardiaceæ; Ochnaceæ (on very young leaves only, the adult foliage being hard and vitreous); Podostemeæ; Polygoneæ; Amarantaceæ; Piperaceæ; Lauraceæ (few); Chrysobalaneæ (often much infested); Combretaceæ; Myrtaceæ (rarely on true Myrtles, but a great pest to the large handsome flowers of the suborders Barringtonieæ and Lecythideæ); Passifloreæ; Cucurbitaceæ; Rubiaceæ (few out of the vast number of Amazon species); Compositæ (all weeds); Boragineæ; Verbenaceæ; Bignoniaceæ. Besides these, there are other orders, which contain a few species with mild juices, and leaves (and even wood) not too tough for a caterpillar's jaws, which are doubtless chosen by certain species of butterflies as food for their progeny; and nearly all the very large flowers are apt to be plagued by caterpillars, as well as by the grubs of flies and beetles*.

Some caterpillars seem to have a decided taste for bitters; and narcotics are rarely objected to; indeed I should say that most insects are decidedly partial to them, while bees and wasps seem to have a positive pleasure in getting drunk. The very few phyllophagous beetles whose habits have come under my notice feed on narcotic plants. At the falls of the Rio Negro, just south of the equator, a common weed in the village of Saõ Gabriel is *Solanum jamaicense*, Sw., growing (when not disturbed) to the size of a currant-bush, and bearing large angular soft woolly leaves. In February 1852, there appeared swarms of a large black beetle, whose corpulent abdomen was barely half-covered by the elytra (whence I suppose it an ally of our Meloës), and whose sole food was this *Solanum*. Their feeding-times were the dusk of evening and morning, when they would arise, as it were, out of the earth, hover over the plants like a swarm of bees, and then settle down in such numbers that the plants were black with them. From one of the *Solanum*-plants I began to fill a bottle with beetles; but although I scared away twice as many as I captured, at the end of ten minutes nothing was left of the leaves but the midribs. A few beetles lingered on the *Solanum* all through the hot day, scarcely feeding at all, and apparently narcotized. I believe our own Oil-beetle eats the narcotic foliage of buttercups, but I know not if it ever goes the length of getting tipsy on it.

Before entering on the main object of this paper, which is to record the facts of certain migrations that have fallen under my notice—rather as problems to be solved by abler naturalists than myself, than with the pretension to offer any complete solution of my own—I may digress so far as to say that when I reached the Amazon in 1849, I considered myself fortunate in finding the zoological portion of the field already occupied by two such able naturalists as Messrs. Bates and Wallace, thus leaving me free to bestow my undivided attention on the botany. There are indisputable advantages in the concentration of one person's energies on a single kingdom of Nature; but in the consideration of many important general problems the disadvantages of this circumscribed range of observation are manifest. I could not, for instance, devote any time or take any pains to ascertain the perfect insect of the larvæ which fed on my plants; nor can the zoologist keep a specimen of every plant which an animal feeds upon. When a zoologist, a botanist, and a geologist, each having had the requisite previous training, shall combine to explore anew the Amazon valley, they will be able to connect many facts which now unavoidably remain isolated, and to deduce therefrom many interesting particulars of the course and actual distribution of organized beings therein. For myself, I am free to confess that I too generally looked on the insect world as enemies to be avoided or destroyed. Mosquitos and ticks sucked my blood; cockroaches ate and defiled my provisions; caterpillars mutilated the plants when growing; and ants made their nests among the dried specimens and saturated them with formic acid, or even cut them up and carried them away bodily. I recollect my horror at coming home and finding my house invaded by an army of "Arriero" or "Sauba" ants, who had fallen on a pile of dried specimens, and were cutting them up most scientifically into circular disks whose radius was just equal to the artist's own longest diameter. The few notes on insects scattered through my journals relate, indeed, chiefly to ants—who deserve to be considered the actual owners of the Amazon valley, far more than either the red or the white man. In fine, when I venture to offer these imperfect jottings to the notice of zoologists, I feel that I can at best be considered only an interloper in a province not my own.

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* The above list has no further value than that of indicating, so far as my notes and recollections serve me, the kinds of plants which I have seen most maltreated by caterpillars in the Amazon region.

Having above indicated the kinds of plants apparently most in request with the larvæ of the Lepidoptera, I wish now to recall the attention of naturalists to certain transits or migrations of the adult insects across the Amazon, which have already been described by Messrs. Edwards, Wallace, and Bates, and perhaps by other travellers. The first time I fell in with such a migration was in November 1849, near the mouth of the Xingú, when I was travelling up the Amazon from Pará to Santarem; and it is thus sketched in my Journal:—

"The wind dropping in the afternoon, we accompanied a party of sailors from the brig, in a canoe, to what was now a muddy island, but in the rainy season had been a shoal some fathoms under water—we in quest of plants, and they of eggs of ducks and "tuyuyús"; but after stumping about for above an hour in the hot mud, which parboiled our legs and feet, we reembarked, having found no plants except a *Pontederia* and a *Cyperus*, and the sailors no eggs at all. As we returned to the brig we saw a vast multitude of Butterflies flying across the Amazon, from the northern to the southern side, in a direction about from N.N.W. to S.S.E. They were evidently in the last stage of fatigue: some of them attained the shore; but a large proportion fell exhausted into the water, and we caught several in our hands as they passed over the canoe. They were all of common white and orange-yellow species, such as are bred in cultivated and waste grounds, and, having found no matrix whereon to deposit their eggs to the northward of the river (the leaves proper for their purpose having probably been already destroyed, or at least occupied, by caterpillars), were going in quest of it elsewhere."

The very little wind there was blew from between E. and N.E.; therefore *the butterflies steered their course at right angles to it*; and this was the case in subsequent flights I saw across the Amazon, although when the wind was strong the weaker-winged insects made considerable leeway, and would doubtless most of them succumb before reaching land. But the most notable circumstance is that *the movement is always southward*, like the human waves which from the earliest times seem to have surged one after the other over the whole length of America, generating after a time a reflux northwards, as in the case of the empire of the Incas. Is this tendency southwards the continuation of an impulse given in the remote past by the influx at the north-eastern and north-western corners of America of races of insects as well as of men to people the vast continent, or to dispute its possession with beings already existing there? For, allowing their due weight to such motives as hunger and desire, they seem insufficient to explain a movement invariably directed towards the same point of the compass; and if, as I suppose, butterflies steer their flight at right angles to the wind, because they thus make most headway, why do they not sometimes cross from south to north, which would be quite as advantageous with an easterly wind, unless they inherit some instinct which constantly impels them southward?

Since my return to England I have read Mr. Bates's graphic description of a flight of butterflies across the Amazon below Obidos, lasting for two days without intermission during daylight. These also all crossed in one direction, from north to south. Nearly all were species of *Callidryas*, the males of which genus are wont to resort to beaches, while the females hover on the borders of the forest and deposit their eggs on low-growing, shade-loivng *Mimosæ*. He adds, "The migrating hordes, so far as I could ascertain, are composed only of males"*. It is possible, therefore, that in the flights witnessed by myself the individuals were all males—in which case the flights should probably be looked upon, not as migrations, but dispersions, analogous to those of male ants and bees when their occupation is done, and they are doomed by the workers to banishment, which means death. In the case I am about to describe, however, the swarms certainly comprised both sexes, although I know not in what proportion; and their movements were more evidently dependent on the failure of their food.

In the year 1862 I spent some months at Chanduy, a small village on the desert coast of the Pacific northward of Guayaquil, where one or two smart showers are usually all the rain that falls in a year: but *that* was an exceptional year, such as there had not been for seventeen years before—with heavy rains all through the month of March, which brought out a vigorous herbaceous vegetation where almost unbroken sterility had previously prevailed. In April, swarms of butterflies and moths appeared, coming from the east, sucking the sweets of the newly opened flowers, and depositing their eggs on the leaves, especially of a *Boerhaavia* and of a curious Amaranth (*Frœlichia*, sp. n.) not unlike our common Ribgrass in external aspect—until caterpillars swarmed on every plant. New legions continued to pour in from the east, and, finding the field already occupied, launched boldly out over the Pacific Ocean, as Magalhaens had done before them, there to find a fate not unlike that of the adventurous navigator†. No better luck attended most of the offspring of their predecessors, especially those who fed on the *Boerhaavia*, which was much less abundant than the *Frœlichia*. The shoal of caterpillars advanced continually westward, eating up whatever to them was eatable, until, on nearing the sea-shore and the limit of vegetation, I used to see them writhing over the burning sand in convulsive haste to reach the food and shelter of some *Boerhaavia* which had haply escaped the jaws of preceding emigrants; but, failing this, thousands of them were scorched to death, or fell a prey to the smaller sea-side birds, to whom they were doubtless a rare dainty.

The explanation of this continual westward movement is not difficult. A few leagues inland, instead of the sandy coast-desert with here and there a tree, we find woods, not very dense or lofty, but where there is sufficient moisture to keep alive a few remnants of the above-mentioned herbs all the year round, and doubtless also of the insects that feed upon them. There are also cattle-farms; and around the wells from which water is drawn and served to the cattle, the same weeds are continually springing up; while the seeds, even of those that grew on the desert, remain imbedded in the sand and retain their vitality during all the years of drought. When the rains come on, therefore, they cause, as it were, a unilateral development of the vegetation from the forest across the open grounds, and a corresponding expansion of the insect-life which breeds and feeds upon it.

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* 'Naturalist on the Amazons,' vol. i. p. 249

† Here also the course attempted to be steered by the insects was across the strong southerly breeze that was blowing.

Results the same in principle, but diverse in mode, would take place under different local circumstances. Thus, if we suppose an oasis in the midst of a desert exposed to the same exceptional access of moisture as the desert of Chanduy with its forest skirt, there would be generated an extension of organic life radiating outwards in all directions.

Besides the migrations above recorded, I have many times in South America seen butterflies flying across rivers so wide that it is impossible to suppose they could be guided by any indication of sight or smell. Animals of higher organization and stronger reasoning-powers would probably turn aside along the shore of the river or ocean in quest of food for themselves and their offspring; but there are plainly cases where frail little creatures, such as butterflies, must go straight forward at a venture, and either attain their object or perish.

The movements of Ants registered in my journal are (as may be supposed) chiefly such as were hostile to myself, and they do not throw much additional light on their habits. "Ecitons," or Foraging Ants (called *Cazadoras* in Peru), seem to be true wandering hordes, without a settled habitation; for a certain number of them may always be seen carrying pupæ, apparently of their own species; but they sojourn sometimes for several days whenever they come upon suitable food and lodging. I have sometimes thought that the name "Tauoca" or "Taboca," applied to these ants on the Amazon, and also to bamboos of every kind, might indicate that they really made their nest in the cavities of bamboos; but I have been unable to verify it, although the name "Tachí" or "Tacýba" is certainly given to certain trees (*Tachia guianensis*, Aubl., *Triplaris surinamensis*, Camb., &c.) and also to a very wicked set of ants that inhabit the hollow branches of those trees. Hundreds of times I have come upon marching columns of "Ecitons" in the forest, and have sometimes paid dearly for my heedlessness in stepping on them. Once at midnight, in the depth of the forest, I got entangled with an army of them on its march; which seems to show that they are on foot at all hours*.

The first time I saw a house invaded by *Cazadoras* was in November 1855, on the forest-slope of Mount Campana, in the eastern Peruvian Andes. I had taken up my abode in a solitary Indian hut, at a height of 3000 feet, for the sake of devoting a month to the exploration of that interesting mountain. The walls of the hut were merely a single row of strips of palm-trees, with spaces between them wide enough to admit larger animals than ants. One morning soon after sunrise the hut was suddenly filled with large blackish ants, which ran nimbly about and tried their teeth on everything. My *charqui* proved too tough for them; but they made short work of a bunch of ripe plantain, and rooted out cockroaches, spiders, and other suchlike denizens of a forest hut. So long as they were left unmolested, they avoided the human inhabitants; but when I attempted to brush them away they fell on me by hundreds, and bit and stung fiercely. I asked the Indian's wife if we had not better turn out awhile and leave them to their diversions. "Do they annoy you?" said she. "Why you see it is impossible for one to work with the ants running over everything," replied I. Whereupon she filled a calabash with cold water, and going to the corner of the hut where the ants still continued to stream in, she devoutly crossed herself, muttered some invocation or exorcism, and sprinkled the water gently over them. Then walking quietly round and round the hut, she continued her aspersion on the marauders, and thereby literally so damped their ardour that they began to beat a retreat, and in ten minutes not an ant was to be seen.

Some years afterwards I was residing in a farmhouse on the River Daule, near Guayaquil, when I witnessed a similar invasion. The house was large, of two stories, and built chiefly of bamboo-cane—the walls being merely an outer and an inner layer of cane, without plaster inside or out, so that they harboured vast numbers of cockroaches, scorpions, rats, mice, bats, and even snakes, although the latter abode chiefly in the roof. Notwithstanding the size of the house, every room was speedily filled with the ants. The good lady hastened to fasten up her fresh meat, fish, sugar, &c. in safes inaccessible even to the ants; and I was prompt to impart my experience of the efficacy of baptism by water in ridding a house of such pests. "Oh!" said she laughingly, "we know all that; but let them first have time to clear the house of vermin; for if even a rat or a snake be caught napping, they will soon pick his bones." They had been in the house but a very little while when we heard a great commotion inside the walls, chiefly of mice careering madly about and uttering terrified squeals; and the ants were allowed to remain thus, and hunt over the house at will, for three days and nights, when, having exhausted their legitimate game, they began to be troublesome in the kitchen and on the dinner-table. "Now," said Doña Juanita, "is the time for the water cure;" and she set her maids to sprinkle water over the visitors, who at once took the hint, gathered up their scattered squadrons, reformed in column, and resumed their march. Whenever their inquisitions became troublesome to myself during the three days, I took the liberty to scatter a few suggestive drops among them, and it always sufficed to make them turn aside; but any attempt at a forcible ejectment they were sure to resent with tooth and tail; and their bite and sting were rather formidable, for they were large and lusty ants. For weeks afterwards the squeaking of a mouse and the whirring of a cockroach were sounds unheard in that house*.

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* See Mr. Bates's full and lucid account of these insects, *l. c.* p. 350.

The most remarkable migration that I have myself witnessed in South America is that of the great Wood-Ibis (*Tantalus loculator*), called "Jabirú" in Brazil, "Gauán" in Venezuela, between the Amazon and the Orinoco, a distance of from 300 to 500 miles in a straight line, but a thousand or more following the course of the rivers. The migrations are so timed that the birds are always on the one river or the other when the water is lowest and there is most sandy beach exposed, affording the greatest extent of fishing-ground. In the years 1853 and 1854, when I was at San Carlos del Rio Negro (lat. 1° 53½' S.) I saw them going northward in November and returning southward in May, and had the pleasure of having some of them stay to dine with me. One of their halting-places on their way to the Orinoco was on islands near the mouth of the Casiquiari, at only a few hours' journey above San Carlos. There I have seen them roosting on the tree-tops in such long close lines, that by moonlight the trees seemed clad with white flowers. They descend to sandy spits of islands to fish in the grey of the evening and morning, *i. e.* before betaking themselves to their eyry, and before resuming their journey on the following day. The scarcity of fish in rivers of clear or black water is well known; and even were they more abundant, this very clearness of the water would render it difficult for fish-eating fowls to catch them, unless when there was little light; hence, perhaps, the Ibis's choice of hours for fishing; and the turbid water poured into the Rio Negro by the Casiquiari dulls its transparency at that point, which makes it eligible for a fishing-station, leaving probably only a single day's stage for the travellers to reach the Orinoco. The Ibises, however, did not, as one might have supposed, turn up the Casiquiari, but held right on to the north, crossing the isthmus of Pimichin, and descending the Atabapo to the Orinoco. Some of them, I was told, would halt on the Guaviare, whose turbid waters, alligators, turtles, &c. quite assimilate it to the Solimões or Upper Amazon; and others push on to the Apuré; the former lot, however, are said to travel chiefly by way of the Japurá from the Amazon. Those that frequent the Upper Orinoco return in May; and their halting-place near San Carlos is not at the mouth of the Casiquiari, but on islands a day's journey below the village, so that they are at that season less persecuted by the Indians. If they went all the way down the Rio Negro in May, they would reach the Amazon long before its beaches began to be exposed; but it has been ascertained that they sojourn awhile on the Rio Branco, whose beaches are earlier uncovered. Flocks of Wild Ducks sometimes accompany the Ibises; and it is quite possible that some of the smaller aquatic and riparial fowls make similar migrations.

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* The ants called "Carniceras," or Butchers, in Maynas, are probably of a tribe distinct from the Foragers; for they are burrowing ants, and are said to prefer the flesh of human carcases to any other food. Padre Velasco, in his 'History of Quito,' assures us that they will make a perfect skeleton of a corpse the very day it is buried, and that they devour any disabled animal, however large, they find in the forest.

When the Ibises are roosting, a shot or two from a gun is enough to make the whole caravan take to flight and remove to some distance; but the Indians of San Carlos know better than to scare them away with fire-arms. They get into their canoes a little after midnight, creep silently up the river, and under cover of the night disembark beneath the trees where the Ibises are roosting. Then, when at break of day the birds wake up, and begin to stir and to be visible, the Indians pick them off with poisoned darts from their blowing-canes, in great numbers, before the bulk of the flock takes alarm; so that they mostly return to the village with great piles of dead Ibises; and although this lasts only three or four days, the quantity killed is so great that, what with fresh and what with barbacued game, everybody feasts royally for a fortnight; whereas throughout the rest of the year, the dearth of provisions exceeds what I have experienced elsewhere in South America.

The Ibises doubtless undertake these voyages from the testimony and under the guidance of the elders, far more than from any inherited knowledge, or instinct; whereas the flights of butterflies one would think must be directed by instinct alone, without any aid from experience.

Many mammals wander far in search of food; and some that go in bands, such as wild Pigs and some Monkeys, have known feeding-places at certain times of the year, when some particular kind of fruit is in season there; so that the experienced Indian hunter often knows in what direction to bend his steps to fall in with a certain class of game. It is well known how fond all animals are of the Alligator-pear, which is the fruit of a large Laurel (*Persea gratissima*). I have seen cats prefer it to every other kind of food; and the wild cat-like animals are said to be all passionately fond of it. I have been told by an Indian that in the forests between the Uaupés and the Japurá, he once came on four Jaguars under a wild Alligator-pear-tree, gnawing the fallen fruits and snarling over them as so many cats might do. I have gathered flowers of at least four species of *Persea*, but was never fortunate enough to find one of them with ripe fruit; so that I have missed seeing the concourse of animals of many kinds which I am assured assemble in and under those trees, attracted by the fruit. While speaking of fruit-eating carnivora, it is worth mentioning that Dogs in South America often take naturally to eating fruit. I had in Peru a fine Spanish spaniel who, so long as he could get raw ripe plantains, asked for no better food. He would hold them between his paws, and pull off the skin in strips with his teeth so delicately as not to foul them in the least; so that I have occasionally eaten a plantain of his peeling.

I fancy Monkeys sometimes go on day after day along the banks of a river, their rate of progress depending on the quantity of food they find to eat and waste. I have watched them at this in a strip of Mauritia palms, which stretched for a distance of some days' journey along the banks of a river. The Chorro (Barrigudo of Brazil), a monkey of the hot plain, sometimes ascends the slopes of the Andes to five or six thousand feet, apparently to eat the fruit of the Tocte or Quitenian walnut (an undescribed species of *Juglans*), which is frequent at that elevation; but it is said never to pass a night there.

An Indian will tell you at what time of year certain fruit-eating fowls are to be met with on the banks of a river, and at what time they must be sought for deep in the forest. I remember coming on a flock of one of the small Turkeys called Cuyubi (*Penelope cristata*, or an allied species), on the banks of the Uaupés, feeding on the fruit of so deadly a plant as a *Strychnos* (*S. rondeletioides*, Benth. in Pl. Spr.); but the succulent envelope of the fruit is innocuous, like that of our poisonous Yew. I had been forwarned that we might expect to find them at that particular spot, and thus occupied; so that we had our guns ready, and knocked several of them over. Indeed they were so tame, or so gluttonous, that when a shot was fired and one of them fell, the rest either took no heed or only hopped on to another branch and recommenced feeding; and it was not until we had fired and reloaded three or four times that the survivors took wing and flew off.

On the slopes of the volcano Tunguragua, the steepest and most symmetrical cone, though not the loftiest, of the Quitenian Andes, I have seen flocks of another Turkey (allied to, but distinct from, the Uru-mutún of Brazil) feeding on the plum-like drupes of the Motilon*, and on the berries of an undescribed Melastome. Besides these fruit-trees, there were also numerous fruit-bearing bushes near, including some true Brambles, Whortleberries, and a Hawthorn, all of which probably afforded food to the turkeys. This species seems to inhabit a zone, between 6000 and 10,000 feet, on the wooded flanks of Tunguragua, and within those limits to make the perpetual round of the mountain, being always found on that side where there is most ripe fruit to be had; and the birds are so tame and sluggish when feeding that the Indians easily kill them with sticks.

I should suppose that these and other gallinaceous birds have their fixed centres of resort (breeding- and roosting-places) from which they never stray far. Many Parrots and Macaws, I know, have. On the western slopes of the Quitenian Andes, immense flocks of Parrots ascend by day to a height of 8000 or 9000 feet, where they ravage the fields of maize and other grain, but always descend to certain warm wooded valleys, at 2000 to 4000 feet, to roost. The flights of vast multitudes of garrulous parrots and macaws to and fro between their roosting- and feeding-places, in the grey of the evening and morning, is one of the first things that strike the attention of the voyager on the Amazon.

The periodical appearance of certain birds in a district has been supposed by the inhabitants to have some mysterious connexion with the Christian festivals. Thus there are two beautiful little birds in Maynas, apparently belonging to different genera, for one of them is a Seven-coloured Tanager (*Pajaro de siete colores*), and the other (which I have not seen) is said to be of a bright blue colour and differently shaped; but both are called by the Indians *Huata-pisco* (Bird of the Year), because they make their appearance together, in large flocks, about the end of the year (people will tell you, precisely on Christmas-day), and remain throughout January, when they are seen no more until the same epoch comes round again. Mr. Bates has given a capital account of the movements of these hunting-parties of frugivorous and insectivorous birds, and of the superstition of the *Papa-uirá* or Patriarch Bird, who is supposed to head them (vol. ii. p. 333 *et seq.*). I suspect that this is something more than mere superstition, and that the Patriarch leaders are not one but several to each predatory band.

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* This name is given to *Symplocos cernua*, H. B. K., and also to two (or more) species of *Hieronyma*, all bearing edible drupes.

The abundance of fish in rivers of white water, and their scarcity in black-water rivers, may easily be shown to depend chiefly on the luxuriant littoral vegetation of the former and its scarcity or utter absence in the latter; for on the Rio Negro there are (with one notable exception*) no aquatics, and no shore grasses. Compare this with the broad fringe of tall succulent amphibious grasses on the shores of the Amazon, or detached and floating down it in the shape of large islands,—and of luxuriant aquatics, some fixed by roots, others floating (*Victoria*, *Jussiæa*, *Pontederia*, Frogbits, *Azolla*, *Salvinia*, *Pistia*, &c.), in deep still bays, but especially in lakes and channels communicating with the main river.

Some of the tributaries of the Rio Negro, however, have plenty of fish—namely, those of more or less turbid water, of which the Rio Branco holds the first rank, and after it come the Marauiá and Cauaborís, all entering on the left bank. In these rivers many Amazon fish are said to be repeated. About the mouth of the Rio Branco is the only place in the Rio Negro where the Pirarucú is found—that noble and remarkable fish, so characteristic of the Amazon. With the exception of the Pirarucú, most of the larger fish of the Amazon recur on the Upper Orinoco, above the cataracts; at least the Indians assert them to be the same, and to unskilled eyes they are undistinguishable. The Valenton, or Lablab, of the Orinoco (for instance) is surely the same as the large Pirahyba of the Amazon; the Pavon as the Tucunaré; the Rallado as the Surubím; the Murucútu as the Tambaquí; the Cajáru as the Pirá-arára, and so on. And if the Tambaquí of the Amazon have been correctly identified with *Cichla temensis*, then a large fish inhabiting the Temi, a small black-water tributary of the Orinoco, is the same one that abounds in the white water of the Amazon: but this needs confirmation; for white-water fish are known to shun black waters, and the Tambaquí is (so far as I know) absent from the Rio Negro proper, although it begins to be found a little way within the Casiquiari.

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* That of the Podostemons on granite rocks in the falls and rapids.

Supposing these fishes of the Amazon and Orinoco to be really identical, the question arises, Has there been and is there still any migration of fish between those rivers, by way of the Negro and the Casiquiari? or does their actual distribution date from the period when chains of lakes preceded the rivers to which the waters are now limited, and the colour and properties of the latter were more uniform throughout the whole region?

Many of the fishes of the Rio Negro travel up it to spawn, and especially up some of its tributaries; but the wanderings to and fro of fish in quest of food may be compared to that already noted of wild turkeys; for the principal subsistence of fish in the Rio Negro is on the fruits of riparial trees, some of which seem scarcely touched by either bird or monkey. A small laurel-like bush (*Caraipa laurifolia*, S.) lines the banks in many places, and bears damson-like drupes, which are the favourite food of that delicious fish the Uaracú or Aracú. When the ripe drupes are dropping into the water they attract shoals of Uaracú. Then the fisherman stations his canoe at dawn of day in the mouth of some still igarapé, overshaded by bushes of Uaracú-Tamacoarí (the native Indian name of the tree), and with his arrows picks off the fish as they rise to snatch the floating fruits. It ought to be mentioned that the fish of the Negro, if much fewer, are some of them perhaps superior in flavour to any Amazon fish, whereof the Uaracú is an example, and the large Pirahyba is another, the latter being so luscious that it is difficult to know when one has had enough of it, whereas the same or a very closely allied species of the Amazon is often scarcely edible*.

I have, in what precedes, purposely avoided speaking of the way in which animals prey on each other, because the ultimate measure of the amount of animal life must always depend on that of vegetable life, and not because I shut my eyes to the fact. In proof of this, take the following note from my Journal, under date May 15th, 1857, written on the Bobonasa, a tributary of the Pastasa, during my disastrous journey from Peru to Ecuador.

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* For further information on the fishes of the Rio Negro I must refer to Mr. Wallace's interesting account of that river ('Travels,' chs. 9, 10 & 16), and to Schomburgk's 'Fishes of Guiana.'

"This morning, coasting along a low shore, our men spied a small white Alligator sleeping in the sun, and killed him with their lances. His stomach was distended by some food he had taken, and on piercing it a snake's tail protruded. I laid hold of it and drew out the snake, which was tightly coiled up. It was still alive, though so much crushed below the head as to be unable to move away. It was a land species, not venomous, yellow, with black spots on the back, the body thick, passing abruptly into a short slender tail, the entire length just 3 feet, and its destroyer no more. Thus we go on preying on each other to the end of the chapter. This poor snake, while watching for frogs among the moist stones and roots, little dreamt he was about to serve for an alligator's meal, nor the alligator that he would soon be eaten up by Indians. The snake, however, died with an empty belly, while the alligator had gotten his breakfast, which was some consolation; for it is a very 'Let-us-eat-and-drink-for-tomorrow-we-die' sort of life that all God's creatures (man included) live in this wild region."

I leave these *disjecta membra* in the hands of naturalists, hoping that they may find among them some bone to pick. They bear on many problems for which there do not yet exist materials, nor do I possess the skill, requisite to arrive at a correct solution. On one point only I am pretty clear, viz. that almost every kind of animal now existing in Cisandine Tropical America might find suitable food and lodging on any parallel between the southern tropic and the mouth of the Orinoco; which is as much as to say that they would find everywhere, either the one plant they most delight to feed on, or others which might suit them almost or quite as well. The continual substitution of new forms encountered as we advance in any direction, does not, on a superficial view, show much correspondence between animals and plants—a fact which may be put otherwise, thus:—Suppose on a given area at the foot of the Andes every species of some class of animals to be distinct from those of the same class on an equal area at the mouth of the Amazon, it does not therefore follow that every plant is different on the two areas; we know, indeed, that such is not the case. Yet the modifications that have been and are still in progress among vegetable forms must have some correspondence with those that take place in animals; for all the realms of Nature act and react on each other. The atmosphere and the earth (with its productions, animal and vegetable) are continually giving and taking; and as their actual relations to each other vary more widely at different points along the equatorial belt than elsewhere on the earth's surface, it is plain that what seems equilibrium is either oscillation or progress in some direction. If plants were the only organic existences, and there were no animals to aid in their reproduction, to feed upon them, to dispose of their dead carcasses, &c., the dominant forms would doubtless be quite different from what they are now. Darwin has shown by an admirable series of observations how necessary insect agency is to the fertilization of the flowers of many plants. Hence the organs of those insects and the parts of the flowers have been (and are being) continually modified, or moulded, the one on the other. I can conceive that if certain Orchids were henceforth entirely freed from the visits of insects, their flowers, notwithstanding the apparent permanence of inherited (though now useless) peculiarities, would immediately *tend* to revert to the symmetry which no doubt they possessed in the remote types. I have a good deal of evidence to show that in tropical countries many peculiarities of structure in the leaves and other parts of plants (prevailing through large suites of species and genera) have been brought about, and are still in part maintained, by the unremitting agency of insects, especially of Ants. These and many other matters require the fullest investigation before the precise relations of the changes, in animals and plants, that are taking place under our eyes can be properly understood and appreciated.

A Catalogue of Erycinidæ, a Family of Diurnal Lepidoptera. By H. W. Bates, Esq., F.Z.S. &c., Assist. Sec. Roy. Geogr. Soc. (Communicated by George Busk, Esq., Sec. L.S.)

[Read June 20, 1867.]

The Family Erycinidæ has increased so greatly, both in genera and species, since the last time its members were passed in review (by Westwood, in Doubleday and Hewitson's 'Genera of Diurnal Lepidoptera,' in 1851), that a new catalogue of its contents is much required. It is my intention, in the present memoir, to endeavour to supply this want, and to suggest a plan of classification of the genera—a work which has not hitherto been attempted. The number of described species at the present time is not fewer than 630. In 1819, when Godart treated of the group, as one genus, in the 'Encyclopédie Méthodique,' only 134 species were described; and in 1851, Professor Westwood could muster only 247, exclusive of a few species insufficiently characterized by the older authors, and the knowledge of which at present appears to be lost.

The Erycinidæ are well distinguished from all other Butterflies, with the exception of the genus *Libythea*, forming a separate group allied to the Erycinidæ, by the anterior pair of legs in the males being aborted, without tarsal joints, or trace of claws and spines, the same legs in the females being of normal structure. The other characters which have been employed to distinguish the group are far from being so constant. The palpi are variable in length and shape; and the differences scarcely suffice to distinguish even subordinate groups of the family. The neuration of the wings, too, in some of the genera is very similar to that of the Lycænidæ, and in others differs from the Nymphalidæ only in the absence of an upper discocellular nervule to the fore wings; but this is not quite a definite character, as some species possess this nervule. The metamorphoses are also variable, some genera resembling the Nymphalidæ in the chrysalis being suspended by the tail*, and others the Lycænidæ in being recumbent and girt with silken threads. Too little is known of the caterpillars to enable us to say whether they offer any peculiarity. All the species, in the adult state, are of smaller size and weaker structure than the average of the Nymphalidæ, and are distinguished by the tenuity and fragility of the wing-membranes.

The geographical distribution of the Erycinidæ is interesting. All, except 34 species, are found in Tropical America. The whole of the Old-World species, 30 in number, belong to one subdivision, which is not, however, peculiar to the eastern hemisphere, the New World possessing a few genera coming within the same group. One species only is found in Europe, the well-known English butterfly, *Nemeobius Lucina*. The species of extratropical North America, four in number (one found in the south-eastern States, and three on the western side of the Sierra Nevada) belong to Tropical American genera, of a subfamily which is peculiar to the New World. The family appears to be most numerous and flourishing in the equatorial zone, diminishing in the number of its representatives as we approach either tropic; and, with very few exceptions, the species are confined to the shades of the great forest which covers the lower levels of nearly the whole of this vast region. I collected, myself, 370 species on the banks of the Amazons, or three-fifths of the total number of known species. The family is remarkable for the wonderful diversity of form and colouring which it presents; and the habits of the species are almost equally varied. Some are of very slow, lazy flight, whilst others are excessively rapid in their movements. It may be stated, however, as a universal rule, that their flight is short, never exhibiting the sustained motion which is characteristic of the Nymphalidæ, Satyridæ, and other superior families of butterflies. A large number of genera have the habit of settling on the underside of leaves near the ground, extending their wings flat on the leaf. In many genera, on the contrary, the position of the wings in repose is vertical; and a few species settle on the upper surface of leaves with the wings half elevated. As these differences are constant in several large genera, it might be thought that they offered a clue to a natural classification of the family—an object of difficult attainment, if we employ structural characters only; but there are too many exceptions to the rule to render it of any use for this purpose. Thus the Nymphidia and Lemoniades belong to those genera which extend their wings in repose, but *Lemonias*, *Belise*, and *Molela* hold them partially elevated, and *L. zygia* and allies quite vertical; similar exceptions occur in *Charis*, *Mesosemia* and others. Very few species frequent flowers.

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* In a former paper I had employed the character afforded by the position of the chrysalis to divide the Erycinidæ into two subfamilies, *Stalachtinæ* and *Erycininæ*; but I have since found amongst my papers a note of the transformations of *Emesis mandana*, an insect which I once bred from the caterpillar, and found that the chrysalis is suspended by the tail, as in *Stalachtis*. Such a fact as this entirely destroys the systematic value of metamorphosis in this family.

I made a great number of dissections of Erycinidæ from fresh specimens whilst in South America, and prepared drawings of their wing-neuration, palpi, and legs, with a view to discovering sure indications of the natural relationships of the species and genera. Previously the species had been grouped chiefly from similarity of shape, colour, pattern, and general aspect; but something more definite was wanted, as the style of coloration changes abruptly in allied species in some genera, and very often the sexes are of totally different colours and patterns. After many abortive trials I have found the wing-neuration, notwithstanding the frequent anomalous exceptions which it presents, to afford the best characters for primary divivions.

Taking the number of branches to the fore-wing subcostal nervure as the groundwork, it is found that all the Old-World genera have four, and the great majority of the New-World genera only three. The few New-World genera in which there are four, grouped with those of the Old World, form our first subfamily, which I believe to be a perfectly natural one—that is, to comprise forms having a closer blood-relationship to each other than to the members of the other subfamilies. The only exceptions to the number of subcostal branches in the group are presented by two or three small species of *Mesosemia* *, in which the wing-neuration is very aberrant; these, however, offer no practical difficulty in the employment of the character.

This first subdivision disposed of, we come to a group of species of peculiar *facies*, in which the number of subcostal branches varies from two to four, and even varies according to sex. These are the Eurygoninæ, which there is no difficulty in distinguishing from the other groups, by the mode in which the lower radial (discoidal) nervure is connected with the subcostal, especially in the lower wings; it is so perfectly connected that it seems to be a continuation or a lower branch of the subcostal. A trace of this important peculiarity is seen in the first subfamily; but in the remaining groups the nervure in question is completely detached, or united at a right angle to the subcostal by an imperfect nervule. This character leads us to place the peculiar genus *Methonella* in the Eurygoninæ group, which forms our second subfamily.

In all the rest of the family the subcostal nervure possesses only three branches, if we may set aside one or two species as anomalous exceptions; and the lower radial is disconnected from the subcostal, as just now explained. This division, which I call the subfamily Erycininæ, comprehends the great majority of the New-World genera; and although it is further divisible, the groups thus formed are not of the same rank as the three already defined. To subdivide it, I have taken, in the first place, the colour of the antennæ, separating those genera in which these organs are destitute of rings or spots of paler hue, from the remainder, in which they are more or less distinctly ringed. These two subdivisions seem to be tolerably natural; for the first comprehends every species in which the fore-wing subcostal nervure emits its second branch after the end of the cell, and the second excludes every such species, with one evidently aberrant exception, viz. *Helicopis Cupido*.

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* *M. tenera* and *M. idotea*.

Descriptions of New Genera and Species.

DODONA EUGENES.

♂. Closely allied to *D. Egeon* (D. & H. Gen. D. L. pl. 69. f. 2); wings of the same shape, and the form of the tail of the hind wings the same. Above dark, blackish brown. *Fore wing* with a narrow line across the middle (touching neither the costa nor the hind margin), a curved streak near the hind angle, and about thirteen small spots pretty equally distributed over the apical half of the wing; all these marks are whitish except the transverse line and marks near the hind angle, which are slightly tinted with reddish tawny. *Hind wings* with the outer portion traversed by four indistinct brownish-tawny lines, converging from the costa towards the anal angle; at the apex are two black spots edged with light brown. On the broad, square lobe at the anal angle is a quadrate black spot, a slender tail arising from its outer edge.

Beneath, the wings are precisely similar to those of *D. Egeon*, being tawny brown, with stripes and spots of white, silky and shining on the hind wing and costa of fore wing.

Expanse 1″ 9‴ ♂.

Nepaul and Bhotan. The species seems to have been confounded hitherto with *D. Egeon*; but the very different colour and small dimensions of the stripes and spots of the upper surface well distinguish it.

ALESA LIPARA.

♂. Smaller than *A. Priolas*; fore wing much shorter, and outer border of hind wing not bowed outwards near the apex as in *A. Priolas*.

Above uniform dark purple; fore wing with scarcely any trace of the pale lines between the nervures towards the apex. *Beneath* pale brownish gray, much paler than in *A. Priolas*; nervures of the apical half of the fore wing, and lines between them, dark brown. Hind wing with seven small basal spots, and two narrow transverse lines, brown; a submarginal row of seven oblong black spots.

Expanse 1″ 6‴.

Hab. Forests of the river Tapajos, Amazons.

ALESA THELYDRIAS.

♂. Much smaller than *A. Priolas*, and quite distinct in the colours of the male, which resemble those of the females of this genus. Shape of the wings similar, but outer border of hind wing not expanded.

Above brownish tawny. Fore wing with the nervures and lines between them (those terminating on the outer border much thickened towards their terminations), and three short belts across the basal half, dark brown. Hind wing with four transverse belts, the outer margin, and fringe dark brown; besides which the submarginal row of black oval spots of the underside shine through conspicuously. *Beneath* light brownish grey. Base of fore wing free from dark spots, except two minute specks behind the median nervures; apical half of the wings crossed in the middle by a dusky belt, nervures and lines between them dark brown, as on the upperside. *Hind wing with six or seven* small black specks towards the base, beyond the middle are two brown transverse lines.

Expanse 1″ 2‴ ♂.

Hab. Forests of the Cupari River, Tapajos, Amazons.

ALESA HEMIURGA.

♂. Smaller than *A. Priolas.* Dark brown, with a blackish-purple gloss. Outer half of fore wing and outer border of hind wing paler. The pale streaks between the nervures of the fore wing are yellowish and are well-marked from the costa to the hind angle, but clearer in some specimens than in others. Hind wing with the marginal row of black spots visible on the upper surface and margined with yellowish.

Beneath paler than in *A. Priolas,* transverse streaks of hind wings much narrower. Cell of fore wings marked with two black spots.

♀. Smaller and lighter-coloured than *Priolas* ♀. Black markings the same, but of smaller dimensions.

Expanse ♂ 1″ 3‴-1″ 4‴, ♀ 1″ 2‴.

Hab. Ega, Upper Amazons.

ALESA TELEPHAË, *Boisduval.*

♀. Fore wing with the outer margin bowed outwards. Wings above lightish brown varied with paler spots; the markings (in the same position as the dark markings of the ♂) darker brown.

Hind wing with a row of submarginal triangular spots of a brilliant green hue edged with black, and each encircled by a yellow ring.

Beneath same as above, but paler.

This species was rare and found only at Ega, Upper Amazons.

MESOSEMIA SYLVINA.

♂. Closely allied to *M. Cippus* (Hewits. Exot. Butt. Mesos. f. 48, 49). Wings very similar in shape and colours, the latter being brown, with darker brown streaks. The ocellus is moderately large, black, and with three glossy white specks—one large nearest the base, and two minute nearest the apex of the wing.

Differs, in the fore wing, in the two brown streaks nearest the ocellus converging towards the hind margin and in the submarginal streak being slender and strongly waved towards the apex; in the hind wing the central brown streak over the ocellus is absent, and the submarginal streak is slender, waved, and much thickened about the middle.

♀. Darker than the male, dark markings the same.

Hab. Pará and Obydos, Lower Amazons.

MESOSEMIA OLIVENCIA.

♂. Closely allied to *M. Metope* (Hewits. Exot. Butt. Mesos. f. 64, 65). Wings, general colour, and ocellus very similar, but differs on the upper surface, in the fore wing, by the absence of the bluish grey subapical spot, and in the hind wing by two or three of the black streaks passing across the wing to the abdominal margin.

Fore wing above blackish brown, with darker ocellus, and near the outer margin a narrowish grey streak extending from the costa to the hind margin near the hind angle. Hind wing blackish brown on its basal half, the colour terminating in three wavy streaks which pass across the wing; three shorter dark streaks extend a short distance from the apical margin; rest of wing white, except near the dark streaks, where it is bluish grey.

Beneath light brown; ocellus with two dark streaks on its inner side and three on its outer side; beneath the ocellus there are three streaks on each side, the inner of which meet before the hind margin; outer half of the fore wing without dark streaks, but having a narrowish white belt extending from the costa to the hind margin, near the hind angle. Hind wing light brown, outer border broadly white. Across the disk (and the central black spot) is a broad darker brown belt, the rest of the brown part crossed by numerous fine, wavy, dark brown streaks. A macular line traverses the white hind border.

Hab. St. Paulo de Olivencia, Upper Amazons.

MESOSEMIA PHILOCLES, *Linn.*

This species occurs under three distinct forms in the Amazons region, none of which accord very closely with the figures of Clerck and Cramer; they are as follows:—

MESOSEMIA LÆTIFICA.

♂. The fore wing has a fine light-blue patch commencing in a point near the base, enlarging towards the ocellus, and, beyond it, curving round and ending in a point at a short distance from the hind angle. The hind wing has a large space on the disk of a light-blue colour, and five short black streaks proceeding from the costa, the submarginal one sometimes extending in a broken line to the anal angle. Beneath, the dark submarginal line of the fore wing extends from the hind angle to the costa.

Common at Pará.

MESOSEMIA PHILOCLES, *Cram.* t. 184. f. D, E (not f. F, which=*Traga*, Hewits.).

♂. The blue patch of the fore wing has the same extent as in Cramer's figure, and shades into white exteriorly in the same way. The hind wing also resembles Cramer's figure in the almost entire absence of the discal blue, the thickness of the costal streaks, and the double black marginal lines. My specimens differ on the underside from

Cramer's figure, in having on the fore wing a dark submarginal line extending from near the hind angle nearly to the costa. This may have been accidentally omitted in Cramer's figure.

♀. Light brown, with dark streaks crossing the wings.

Common near Obydos in Brazilian Guiana.

MESOSEMIA EGABELLA. *M. Philocles*, var., Hewits. Exot. Butt. Mesos. f. 62, 63 ♂, 61 ♀.

♂. The blue patch of fore wing commences about the middle of the cell and does not blend into white on its outer side; the ocellus is generally quite surrounded by the blue, and is quite destitute of irides or encircling lines. The costal streaks of the hind wing are much finer than in the true *Philocles*; there is no marginal brown line; and the submarginal line is distant from the outer edge of the wing and interrupted.

♀. Same as in ♀ *Philocles*, but outer border of hind wing broadly white.

The Upper Amazons race of *Philocles*. Common at Ega.

MESOSEMIA CALYPSO.

♂. Same form of wings as *M. Philocles*. Above dark blue, glossy and opalescent. Fore wing crossed by six black belts, two of which are curved and enclose the black ocellus, which has a single white pupil. Hind wing crossed by seven black belts.

Beneath light brownish grey; dark belts same as above, but brown in colour. Fore-wing ocellus having three white specks—one larger, central, and two minute external; the ocellus surrounded by a fine brown ring. Hind-wing ocellus small, black, with grey iris, in middle of the third brown belt.

Ega; rare. Allied to *M. antærice*, Hewits.

EURYGONA COCCINELLA.

♂. Closely resembles *E. Zena*, Hewits. (Exot. Butt. Eu. f. 74 & 76), but is much smaller, with the fore wing broadly truncated at the apex, and the hind wing shorter and regularly rounded. In *E. Zena*, ♂, the hind wing is bisinuate near the anal angle. Above deep black. Fore wing with a rounded crimson spot in the middle near the hind margin, the spot not occupying more than about one-third of the surface of the wing. Hind wing with a small rounded crimson spot towards the anal angle.

Beneath brown, with two white submarginal belts as in *E. Zena*; the outer belt of hind wing is strongly curved in the middle, and again forms two lunules near the anal angle; the marginal space near the anal angle, and a line near the hind angle of fore wing, are yellow.

♀. Hewitson, Exot. Butt. Eu. f. 75, as *E. Zena* ♀.

Hab. Upper Amazons, at Tunantins and St. Paulo.

EURYGONA ERYTHRÆA.

♂. Similar in shape and colour to *E. Zena*. Deep black; fore wing with the median area crimson, separated from the hind margin only by a narrow black line. Hind wing with a large rounded crimson spot near the anal angle and close to outer margin; the spot occupying about one-third of the surface of the wing.

Beneath dark brown, with *three* pale submarginal belts. The outermost belt on the hind wing is a little waved and subinterrupted, but forms no lunules. There is a very narrow orange streak near the anal angle; on the fore wing there is no yellow streak near the hind angle.

Hab. Tunantins, Upper Amazons.

EURYGONA CALLIGRAMMA.

♂. 1″ 6‴. Wings of same shape as in *E. Euritæus*, Cram. Above dark brown, deeper towards the base. Hind wing with three white marginal sinuses. Beneath pale brown, crossed by five dark brown belts (including the marginal edging); along the subcostal nervure of the fore wing is an orange streak extending down the basal part of the hind wing. The space between the 1st and 2nd and 3rd and 4th brown belts is lighter in hue, and between the 4th and 5th belts on the hind wing is clear ochraceous yellow. The third belt on the hind wing has two large square black spots about the middle; and the space between it and the 2nd belt is there much wider and yellower in colour.

Antennæ whitish beneath, spotted with black, club ringed at the base with white. Palpi whitish, legs buff-coloured.

♀. 1″ 6‴. Dull light brown above. Beneath, same as in the male, but paler.

Hab. Ega, Upper Amazons.

EURYGONA CHARILIS.

♂. 1″ 8‴. Wings broader than in *E. Euritæus*, Cram. The wing obtuse, and broadly rounded at the apex. Hind wing broad; outer margin subsinuate. Above uniform dark brown, fringe included, with a rich purple gloss in certain lights.

Beneath lighter brown, crossed by two broad ruddy-brown belts; fore wing having besides a broad outer border of the same colour; the spaces between the belts, and the inner side of the first belt, lighter than the ground-colour.

In the hind wing the 2nd brown belt is on its outer edge variegated by a series of orange lunules edged on their outer sides with black. In the middle of this row of lunules is a large deep-black spot; and exterior to it is a waved whitish line, extending from the apex to the anal angle of the wing, and edged on the outer side with black. The outer border is orange, and is very broad near the anal angle.

♀. 1″ 10‴. Above uniform dullish brown. Beneath same as in the male, except that the row of orange lunules of the outer brown belt of the hind wing is expanded into a broadish belt, and that there is an orange line near the hind angle of the fore wing.

Antennæ beneath grey, spotted with black. Palpi and legs pale buff.

Hab. Tunantins and St. Paulo, Upper Amazons.

EURYGONA ANGULATA.

♂. 1″ 7‴. Fore wing with the outer margin forming in the middle an obtuse angle. Hind wing subcaudate in the middle of the outer margin. Above dark brown. Beneath purplish brown, crossed in the middle by a darker, somewhat ill-defined belt, succeeded by a second similar one, but still more indistinct, and having a submarginal indistinct waved line of the same dark-brown hue. Palpi and legs yellow. Antennæ reddish brown, club dusky.

♀. 1″ 10‴. Lighter brown, wings angulated as in the male. Hind wings broader, outer margin bisinuate between the apex and the caudiform lobe, and again faintly bisinuate between the lobe and the anal angle. Beneath, the same.

Hab. St. Paulo, Upper Amazons.

EURYGONA MIRANIA.

♂. 1″ 3‴. Size and shape of *E. Eubœa*, Hewits. (Exot. Butt. Eu. f. 4, 5). Wings above dark brown, hind wing regularly rounded and festooned, fringe of fore wing and sinuses of hind wing white. Beneath light brown, crossed in the middle by an orange streak, edged on the inner side with yellowish and the outer side with dark brown, and flexuous on the hind wing. Close to the outer margin of hind wing is a row of 7–8 pure-white lunules edged with black, the space between them and the border being tawny orange.

♀. The same, but much lighter brown above. Forehead and palpi white, tibiæ and tarsi orange-yellow.

Common at Ega.

EURYGONA MODESTA.

♂. 1″ 8‴. Fore wing obtusely truncated at the apex; hind wing much elongated, but anal angle not produced, rounded, abdominal edge straight, outer margin rounded. Above dark brown, lighter beyond the middle of fore wing. Beneath light brown, lighter towards the outer margin, nervures darker; both wings crossed a little beyond the middle by a line a little darker than the ground-colour; an indistinct row of submarginal dusky lunules to both wings.

♀. 1″ 10‴. The same, but lighter in colour above.

Antennæ brown, ringed with orange brown; club without white ring. Forehead dark brown, palpi and legs clear orange.

Hab. Forests of the Tapajos, rare.

EURYGONA FERRUGO.

♂. 1″ 10‴. Same shape and size as *E. Eutychus* (Hewits. Exot. Butt. Eu. f. 44). Above, basal half of wings black glossed with dark blue;

this followed by a broad glossy blue belt, which forms the outer border on the hind wing; apical part of fore wing dark brown. Beneath light brown; base of wings with a short blackish streak; centre of wings crossed by two rusty-red belts, the outer one four times the width of the inner. Outside of the broad belt, on the fore wing, is a row of three subapical, triangular, black spots, and between them and the inner margin a third rusty belt; on the hind wing there is a row of large, acute-triangular brown spots edged on the inner side with yellowish, and having in the middle a large black ocellus edged on the outer side by a white lunule. The outer border of the hind wing is broadly orange, and the anal angle tinged with glossy purple.

Face, palpi, and legs tawny yellow, forehead brown, with two yellow lines. Antennæ ringed; club black.

Hab. Ega.

This species is closely allied to *E. Eutychus*, differing only in the markings of the underside. It might be considered a mere aberration in which the two outer belts were blended into one, were it not for the broad orange outer border of the hind wing, destitute of fine marginal lines.

EURYGONA CLITHRA.

♂. 1″ 10‴. Same shape and size as *E. Eutychus* (Hewits. Exot. Butt. Eu. f. 44). Wings above black, crossed by a dark-blue belt very much narrower than in *E. Eutychus*, and extending round the outer margin of the hind wing; fringe black. Beneath, fore wing crossed by five rusty-brown stripes as in *E. Eutychus*, and having three black subapical spots. Hind wing with the basal half white, crossed by two rusty-red belts; apical half rusty brown, with a row of sharp angular spots; central ocellus and yellow submarginal line as in *E. Eutychus*, the only difference being that the white ground-colour in the middle of the wing forms a broad belt, gradually widening from the costa to the abdominal margin.

♀. 1″ 10‴. Light brown, disk of hind wing broadly whitish with the black ocellus shining through. Beneath, same as in the ♂.

Hab. Pará, also at Montes Aureos, interior of Maranham.

EURYGONA EXTENSA.

♂. 1″ 7‴. Length of hind wing 8½‴. Closely allied to *E. eubotes*, Hewits. (Exot. Butt. Eu. f. 64); differing in its much larger size and especially in the great length of the hind wing, which, however, is not produced or acute at the anal angle. Above dark brown, glossed with purple, slightly paler on disk of fore wing. Beneath light brown, glossed with lilacine. Wings crossed, much beyond the middle, by a dark red-brown unwaved stripe, followed by a very indistinct dark stripe. The fore wing has besides a distinct, interrupted, dark submarginal line. The hind wing has a row of 9 white submarginal spots, edged on the inner side with black triangular spots, the 4th being much larger, and the space between them and the hind margin orange tawny.

Palpi and legs tawny yellow; face tawny yellow, with a black central stripe.

♀. 1″ 8‴. Fore wing subtriangular, with slightly produced apex, as in ♂. Hind wing not elongated, broadly rounded, with festooned margin. Above light brown. Beneath light lilacine brown; wings crossed beyond the middle by a straight rusty-brown streak, and near the margin by a broad undefined brown stripe, after which, on the fore wing, is a row of very slender dusky angulated lines, and on the hind wing a row of black mostly triangular spots, the fourth of which is much larger than the others.

Face white; palpi, tibiæ, and tarsi orange-yellow.

Hab. St. Paulo, Upper Amazons.

EURYGONA VIOLETTA.

♂. 1″ 3‴. Allied to *E. Arbas*, Cram. pl. 379. Smaller; hind wings shorter. Above blackish brown, fore wing with a large rounded glossy blue patch in the middle of the outer border; hind wing with a streak of similar colour along the abdominal edge, widening at the anal angle, the blue gloss seen only in certain lights. Beneath rusty reddish brown, lighter towards the inner margin of the fore wing; wings crossed in the middle by an orange stripe, edged on each side with brown, and biflexuous on the hind wing. The hind wing has a submarginal row of acute spear-shaped orange streaks, each arising from a black spot, and in the middle of them a large blue-black ocellus; exterior to these is a brown continuous submarginal line.

Palpi and legs tawny; face brown, margined with yellow.

Hab. Forests of the Tapajos.

THEMONE PŒCILA.

♂. 1″ 7‴. Same size and shape as *T. Pais*; hind wing with the outer margin regularly rounded and festooned, with white fringe in the sinuses. Above black; a broad orange belt near the base, commencing within the cell of fore wing and extending to the abdominal margin of hind wing; an oval testaceous-yellow spot across the disk of fore wing beyond the middle, and a smaller one on the hind wing halfway between the orange basal belt and the outer margin.

Beneath, the same, except that there are a white apical spot and several marginal ones on the fore wings. Body, antennæ, and legs blackish.

Hab. Ega.

CHAMÆLIMNAS LÆRIS.

♂ & ♀. 1″ 6‴. Fore wing elongate, broadly rounded at apex; hind wing short, anal angle not passing the tip of the abdomen. Above black, fore wing crossed by an oblique yellow belt of uniform width and not reaching either the costa or the outer margin; apex edged with yellow, preceded by a plumbageous spot. Beneath, the same.

Body, antennæ, and legs black. A yellow spot behind each eye, and on the side of the collar.

Hab. Ega; common.

CHAMÆLIMNAS BRIOLA.

♀. 1″ 8‴. Same shape as *C. Iæris*. Black; fore wing with a triangular spot at the base of the cell, and an elongate-oval oblique spot beyond the cell, yellow. Hind wing with the discal area yellow. Apex of the fore wing edged with yellow. Beneath, the same.

Antennæ, body, and legs black.

Hab. River Ucayali (*Mr. Edw. Bartlett*).

SYRMATIA LAMIA.

♂ & ♀. 1″ 2‴. Closely allied to *S. Dorilas*, Cram., and *S. Asteris*, G. R. Gray (Griffith's An. King. pl. 102). Deep black. Wings crossed near the base by a white belt, beginning in a point at the fore-wing median nervure, and widening to the hind-wing abdominal edge; disk of fore wing with an oblong-oval glossy white spot. Tips of tails white.

Body, antennæ, and legs black.

Hab. Ega.

PHELES RUFOTINCTA.

♂. 1″ 8‴. Same shape and size as *P. Heliconides*, Herrich-Schäffer (Exot. Schmett. fig. 30). Black; basal half of the fore wing with three elongate hyaline spots, and apical part with five shorter and similar spots, but with the outer portion orange-coloured and opake. Hind wing with the outer margin only black, the rest being hyaline, divided by the black nervures; an orange stripe extends along the costa and on the inner side of the outer borders, interrupted by the black nervures.

Body, legs, and antennæ black.

Hab. Ega.

ESTHEMOPSIS CELINA.

♀. 1″ 5‴. Fore wing with costa and outer margin regularly and moderately rounded, apical angle obtuse. Hind wing a little longer than abdomen, outer margin rounded. Fore wing blackish, with a large triangular diaphanous basal patch divided into three elongated spots by the black median nervure and its first branch; apical portion of the wing traversed by a short belt or elongate spot of a pure milk-white hue. Hind wing blackish, with the central and basal portion diaphanous, traversed by the blackish nervures; space between the 2nd and 3rd median branches greyish black.

Beneath, the same as above.

Body greyish; palpi, thorax, and legs yellowish. Fore-wing upper radial nervure joining the subcostal at a distance from the end of the cell, as in *E. Clonia*.

Hab. Ega.

ESTHEMOPSIS ÆOLIA.

♀. 1″ 5‴. Same size and shape as *E. Celina*; differs chiefly in the subapical belt of fore wing being crossed by three black nervures. Fore wing with costal and outer border rounded; apical angle obtuse; hind wing a little longer than the abdomen. Above blackish; fore wing with a large diaphanous basal patch divided by the black median nervure and its first branch; apical portion of the wing with an irregular diaphanous belt, or a series of four spots, of which the three upper are elongated and the lowermost rounded and separated from the rest by a broader black space. Hind wing greyish diaphanous, with darker outer border.

Beneath, the same. Palpi, legs, and thorax yellowish.

Hab. Banks of the Cupari River, Tapajos.

ESTHEMOPSIS LITHOSINA.

♀. 1″ 8‴. Wings more elongated. Fore-wing costa arched, outer margin very much bowed outwards, apical angle obtuse. Hind wing elongated, outer margin from the apex to the anal angle nearly straight. Both wings black, the centre of the basal half of the fore wing diaphanous, traversed by the black median nervure, its 1st and 2nd branches, the discocellular nervule, and a line down the middle of the cell; an elongate milk-white spot or short belt near the apex. Hind wing with the central area diaphanous, divided by black nervures.

Head and palpi ochreous yellow, legs and body blackish, breast white. Discocellular nervule of fore wing uniting with the upper radial after its junction with the subcostal.

Hab. Tunantins, Upper Amazons.

LIMNAS FLAMMULA.

♂. 2″. Closely allied to *L. Zoëga*, Hewits. (Exot. Butt. Lim. f. 2). Wings rich dark purple brown, with the nervures rather paler. A large triangular apical spot on the fore wing, and a moderately broad outer border to the hind wing (not reaching the apex), orange-yellow; a crimson spot near the base of both fore and hind wing.

Beneath, the same, except that there is a crimson spot also on the costa of the hind wing near the base.

Body, antennæ, and legs blackish brown.

Hab. Ega; rare.

LIMNAS SEMIOTA.

♂. 2″. Fore-wing costa arched near the base, thence slightly incurved, and arched again before the apex, apical angle slightly produced, acute; outer margin very slightly curved outwards. Hind wing with apical angle obtuse, rounded. Above rich purplish black (nervures concolorous), with a belt of rich yellowish orange crossing the fore wing slightly beyond the middle and very nearly touching both the costa and the hind angle.

Beneath dark brown, nervures concolorous; belt of fore wing saffron-yellow.

Body, legs, and antennæ blackish. The antennæ are more slender than in *L. Melander* and allies.

Hab. Banks of the Tapajos, at Altar do Chaõ.

ORESTIA TAPAJONA.

♂ & ♀. Closely allied to *O. vitula* (*Limnas vitula*, Hewits. Exot. Butt. Lim. f. 5). Shape and size the same; differs in the wing-lappets being of an orange colour instead of black like the rest of the thorax. The orange stripe of fore wing extends much further towards the hind angle than in *O. vitula*. The subapical buff-coloured fascia is very irregular in shape, being sometimes oblong-ovate, sometimes narrow and elongate as in *O. vitula*, and sometimes it is quite absent.

Hab. Forests of the Tapajos. *O. vitula* is peculiar to the Upper Amazons.

Genus ZELOTÆA, nov. gen.

Fore wing short, broad, subtriangular, with slightly bowed costa and distinct apical angles; hind wing elongate from the base to the anal angle, outer border regularly rounded. Fore-wing subcostal nervure terminating at the apex of the wing, three-branched—two branches before the end of the cell, and the third halfway between the cell and the apex; upper radial joining the subcostal at a distance from the end of the cell; lower radial midway between the subcostal and median nervures, and middle discocellular nervule running obliquely to the subcostal. Palpi straight, pointed, but not visible from above (♂). Antennæ short, light brown, very obscurely spotted above with grey; club thick and distinct, gradually formed. Front legs of ♂ extremely short, especially the femora and tarsi, thinly clothed with scales and a few hairs; middle and hind legs moderately short and thinly clothed with scales; tarsi not perceptibly spined.

These species have a peculiar appearance from their pallid coloration, whitish or grey, varied with darker grey, especially along the nervures. Although similar to *Pandemos* in colours, the much shorter legs and the extremely reduced male fore legs show that there is no real or close affinity between the two genera. The affinities are rather with *Helicopis*.

ZELOTÆA PHASMA.

♂. 1″ 4‴. Fore-wing costa arched; apex subacute; outer margin moderately rounded. Wings above pallid greyish white; fore wing with the nervures, a broadish costal border, a belt crossing the wing beyond the cell from the costa to near the hind angle, a fine submarginal line, and the outer edging pallid brown. Hind wing with the nervures and a submarginal line parallel to the outer border pallid brown.

Beneath darker in colour, and nervures more distinctly bordered with brown.

Body and legs ashy white. Antennæ pallid brown, spotted above with ashy; club pale ashy.

Hab. Ega.

ZELOTÆA DUBIA.

♂. 1″ 4‴. Very similar to *Z. phasma*. Wings greyish white, with the pallid-brown markings of fore wings much fainter. Hind wings without the submarginal brown line.

Beneath darker than above, with the fore-wing costal border and a broad apical and outer border light brown. Hind wing with a narrowish light-brown border.

Hab. Pará.

This species might range as a geographical form of *Z. phasma*.

ZELOTÆA ACHROA.

♂. 1″ 6‴. Fore-wing costa very slightly arched, apex subacute, outer border nearly straight. Fore wing above light brown, with the outer border and two or three rounded spots on the disk pallid whitish; the pale outer border has a subinterrupted brown line down its centre and parallel to the margin; the discal spots are between the branches of the median nervure, the submedian, and lower radial. Hind wing pallid ashy white, with the nervures irregularly bordered with brown.

Beneath, the same, but darker, and the hind wing has a brown outer border. Antennæ brown, scarcely spotted.

Hab. Forests of the Tapajos.

Genus DYSMATHIA, nov. gen.

Closely allied to *Zelotæa*; but the upper radial emitted at the end of the cell. Antennæ moderately short, pale brown, ringed with paler brown, distinctly and rather strongly clubbed. Palpi porrect, not visible from above. Fore legs in male thinly clothed with scales; tarsi more elongated than in *Zelotæa*, pointed. Wings varied with dark streaks and submarginal rows of spots. In one species (*D. costalis*) the fore-wing costa is very strongly bowed, and the hind wing prominent at the anal angle.

DYSMATHIA PORTIA.

♂. 1″ 6‴. Fore wing triangular; costa arched only near the apex, the latter acute, outer border nearly straight; hind-wing outer border and anal angle rounded. Above dull brown, varied with pale slaty blue; a submarginal row of black spots encircled with slaty blue on both wings; disk of wings with a large number of black spots between the nervures.

Beneath pale brown, with the black spots and marks smaller and less distinct.

Body brown. Antennæ pale rufous brown, spotted above with darker brown.

Hab. Pará.

DYSMATHIA COSTALIS.

♂. 1″ 6‴. Fore-wing costa very strongly arched in the middle, apex obtuse; hind wing with anal angle prominent, obtuse. Above pale ashy brown, rufous towards the outer margins, fringe brown. Fore wing with three blackish streaks across the cell, and three between the median and submedian nervures; beyond the cell is a line of blackish lunules commencing on the costa and crossing the wing, strongly bent outwards, to the first branch of the median; nearer the outer margin is a more or less indistinct submarginal dark-brown streak. Hind wing crossed by six dark-brown lines, the fourth of which is bent and interrupted.

Beneath light bluish grey, crossed by lines similar to those above, but with the addition of a submarginal row of rounded spots on both wings.

Antennæ ashy white, ringed with brown.

Hab. Ega.

ZEONIA SYLPHINA.

♂. 1″ 10‴. Closely allied to *Z. Xanthippe*, G. R. Gray (Griffith's An. King. Ins. vol. ii. pl. 102. f. 1). Tail of the hind wings and anal lobe much shorter. Above black; a broadish diaphanous belt crosses both wings at a short distance from the base, and is crossed on the fore wing by the black median nervure and the beginning of its first branch and by the postmedian nervure, and on the hind wing by the costal and median nervures; the margins of the diaphanous belt are quite straight. There is also a broad triangular diaphanous area on the apical half of the fore wing, crossed by six nervures, and a submarginal spot of the same near the apex of the hind wing, crossed by two nervures. The hind wing has a crimson streak commencing at the base, extending along the abdominal edge, bending long before reaching the anal angle, and terminating at the median nervure. The black anal portion has a flexuous stripe of silvery blue. The anal lobe is short and broad, tipped with white. The tail is only 4 lines long, and tipped with white.

Beneath, the same.

Hab. Interior of Ecuador.

SISEME XANTHOGRAMMA.

♂. 1″ 6‴. Same shape as *S. Pallas*, Latr. (Humb. & Bonpl. Zool. pl. 24. f. 7, 8). Differs in the wings being lightish brown, crossed by a saffron-coloured belt, as in *S. Aristoteles*, Latr. (*l. c.* f. 5, 6). Above light brown, the outer portions lineated with blackish, both wings crossed before the middle by an ochreous-saffron-coloured belt, widening from the fore-wing costa to the junction of the wings, and narrowing again towards the hind-wing anal angle, which it does not reach. The belt is bordered with black, and is succeeded near the anal angle by a triangular tawny-orange spot. The fringe is blackish, on the hind wing spotted with white. The hind wing is obtusely angular, but not produced into a caudiform lobe.

Beneath, same pattern, but much paler; differs greatly from *S. Aristoteles*, which has the outer half of the wings beneath darker, traversed by a light-brown belt.

Hab. Tarapoto, East Peru (*Dr. Spruce*).

SISEME SPRUCEI.

♂. 1″ 6‴. Hind wing neither lobed nor angulated, feebly scalloped, with white fringe in the sinuses. Above dark olive-brown; both wings crossed by two pale brown stripes, one across the middle and the second midway between the middle and the apex. Hind wing with a row of three crimson spots near the anal angle.

Beneath, the same, except that the belts are whitish and the whole basal area of both wings is ashy white.

Hab. Valleys west of Chimborazo, alt. 3000 ft. (*Dr. Spruce*).

SISEME CAUDALIS.

♂. 1″ 6‴. Closely resembles in colours *S. Pallas*. Differs in the hind wing being elongated near the anal angle, and forming a distinct caudal lobe. Above black; both wings crossed before the middle by a broadish belt of pure white, narrow near costa of fore wing; outer portion of wings grey in the middle, traversed by black lines. Hind wing with a large transverse red spot at the anal border. Margins of the caudal lobe spotted with white.

Beneath, the same, but a little paler.

Hab. Moyobamba, Peru (*M. de Gand.*).

ERYCINA MINIOLA.

♂. 2″. Closely allied to *E. Melibœus*, F. (*Pyretus*, Cram.),—having, like that species, a white spot above near the base of the costa of the hind wing. Differs in the fore wing being conspicuously broader near the apex, and in the hind wing being greatly elongated, forming a caudal lobe as long as that of *Diorhina Periander*, Cram. (*Laonome*, Bdv.). Fringe of fore wing, as well as of hind wing, varied with white. Crimson belt twice the width of that in *E. Melibœus*; the red anal stripe also much longer, and with angulated edges.

Hab. Ega.

EMESIS SPRETA.

♂ & ♀. 1″ 10‴. Differs from *E. Lucinda*, Cram. (Pap. t. 1. f. E, F), in having narrower wings, with the outer margins much less rounded,—and in colour, being dullish slaty brown, with an indistinct rufous-brown patch near the apex of fore wing, in both sexes. The white subapical spots of *E. Lucinda* ♀ are entirely wanting in the ♀. The black markings are very similar.

Hab. Ega, Upper Amazons; common.

EMESIS HYPOCHLORIS.

♂. 1″ 9‴. Fore-wing costa incurved in the middle, apex very slightly produced; anal angle of hind wing fringed with long silky hairs. Above black, both wings crossed by six belts of a dark glossy slaty blue, the marginal one of hind wing being of a lustrous plumbageous hue; fringe pure white, spotted with black near apex of fore wing.

Beneath, dark glossy blue; brilliant glossy cyaneous towards the outer margins.

Abdomen bright red beneath. Antennæ black above; beneath brown, obscurely spotted with black.

Hab. Ega.

This species has the coloration of many species of *Charis*; but the shape of the wings is that of *Emesis*; the naked eyes and unringed antennæ also remove it from those species of *Charis* which it most resembles.

EMESIS ÆTHALIA.

♂. 1″ 9‴. Dark sooty-brown above and beneath. Fore wing incurved in the middle, apex very slightly produced and obtuse, outer margin scarcely rounded. Hind-wing outer margin gently rounded, anal angle slightly advanced. Above crossed by numerous short dusky streaks, which on the outer half of both wings unite to form three slender undulating belts—one near the cell, and the other two submarginal.

Beneath a little paler than above, dusky streaks much more slender, submarginal belt converted into a row of small spots.

Head, body, and legs sooty-brown.

Hab. Santa Martha, New Granada. Collected by the late M. Bouchard.

CRICOSOMA ERASTE.

♂. 10‴. Fore-wing costa straight until near the apex, where it is bowed, apical angle acute; outer margin of both wings gently rounded. Above rich orange-yellow; costa and base of wings edged with black; the basal half of both wings is varied by short black streaks, of which there are two rows; the apical portion is crossed by three continuous black streaks, the last of which is marginal.

Beneath pale.

Head and thorax dark brown; wing-lappets and abdomen orange.

Hab. Ega.

CRICOSOMA PHÆDRA.

♂. 1″ 2‴. Fore-wing costa very slightly arched to three-fourths of the length, then more strongly bowed to apex; apical angle obtuse; outer margin of both wings curved outwards near the apex and becoming straight towards the hind angle. Above rich orange, varied with a number of small blackish spots which become larger towards the outer margins; four of them form elongate streaks crossing the fore-wing cell from the costa; and the outermost form a submarginal row of spots, which on the hind wing are united into a continuous line. Fringe dark brown.

Beneath, the same, scarcely paler.

Head and body wholly orange-coloured.

Hab. Forests of Tapajos.

MESENE SOPHISTES.

♂ & ♀. 1″. Resembles *M. cingulus,* Stoll (Suppl. Cram. t. 13. f. 4), but wings varied with spots encircled by light-brown lines. Apex of fore wings acute in both sexes. Above brown; basal portion of both wings varied by oblong brown spots margined with buff; a row of similar spots near the outer margins; across the middle of each wing is a red belt which is not continuous from one wing to another, and is much broader on the fore wing, especially towards the costa. Fringe brown, varied with ashy white.

Beneath much paler, and the buff circles and marks broader and more numerous.

Hab. Upper and Lower Amazons.

MESENE FULIGINEA.

♂. 1″. Size and shape of *M. Ærope* (Dbld. and Hew. Gen. D. L. pl. 71. f. 2), wholly sooty-black above, with fringe of fore wings varied with white.

Beneath brown, varied with darker-brown markings or spots, which form more or less regular belts across both wings.

Hab. Villa Nova, Amazons.

MESENE PYRSODES.

♂. 1″ 2‴. Closely allied to *M. Ærope* (Dbld. & Hew. Gen. pl. 71. f. 2); shape of wings very similar, but fringe wholly black. Above black, disk of wings occupied by a large, rich-crimson common spot, which scarcely extends to the subcostal on fore wing, and approaches very nearly to the abdominal edge of the hind wing; its upper margin on fore wing is indented, and it lies much nearer the base than the outer margin.

Beneath dingy brown, with no trace of red spots, except near the inner margin of the fore wing, which has a pallid-rufous cloud; the basal portion of both wings is varied by a number of short dusky streaks; and there is a submarginal row of larger dusky spots on both wings, preceded by bluish lunules.

Hab. Ega.

MESENE LEUCOPHRYS.

♂ & ♀. 1″ 2‴. Closely allied to *M. Phareus*, Cram. (Pap. t. 170. f. C). Above black; disk of wings occupied by a large red spot, leaving broad black costal and outer borders; the costal edge of the spot on the fore wing is indented by the black costal streaks which the species has in common with *M. Phareus*; in the middle of the outer border of the fore wing, near the margin, is a large white spot.

Beneath, the same as above, with the addition of two white spots in the black border of the hind wing.

This species varies much. Sometimes the black borders are no wider than in *M. Phareus*; and the amount of red on the under surface of the fore wing is very unstable. The abdomen, generally black, is sometimes more or less red. The species is found on the Upper and Lower Amazons.

MESENE FENESTRELLA.

♂. 1″. Similar to *M. Hya* (Dbldy. & Hew. Gen. D. L. pl. 70. f. 9). Same size and shape. Above black, with a common crimson discal spot extending close to the base, and including the abdominal edge of hind wing; upper edge, in the fore-wing cell, quite straight and even. The black apical portion of fore wing has in the middle a white spot.

Beneath, the same, with the addition of two white spots in the hind-wing border.

Head, thorax, and wing-lappets black; abdomen red.

Hab. Ega.

This species is quite distinct both from *M. Hya* and *M. leucophrys*.

MESENE PARAENA.

♂. 1″. Probably a geographical form of *M. fenestrella*. The red spot is much larger, extending to the base of the wing and very nearly to the fore-wing costa, and leaving a narrow black border to the hind wing. Colour of the body the same.

Hab. Pará.

MESENE SIMPLEX.

♀. 1″. Similar in form to *M. Phareus* ♀. Above ochreous saffron-colour, with narrow black outer borders, which on the fore wings extend a short way along the costa from the apex.

Beneath, the same.

Head and body entirely ochreous saffron-colour.

Hab. Pará.

MESENE CELETES.

♀. 1″ 3‴. Differs from *M. Phareus* in the wings being more elongated; the outer margin of the fore wing is much bowed outwards, and the fringe spotted with white. Above of an ochreous saffron-colour, with broadish black border to the fore-wing costa and to the outer margins of both wings; the costal border is a little indented, and the outer borders slightly sinuous.

Beneath, the same, except that the outer border of the fore wing has one, and that of the hind wing two white spots, sometimes obsolete or wanting.

Head black; thorax and abdomen ochreous saffron; wing-lappets bright orange.

Hab. Pará.

MESENE BASILISSA.

♂. 1″ 2‴. A robust species, with broad stout thorax; fore-wing costa slightly incurved in the middle, hind-wing prolonged from base to anal angle, and outer margin nearly straight. Above black, disk of wing crossed by a broad reddish-orange belt, beginning within the fore-wing cell, and extending to the abdominal edge, indented on its inner (basal) side and in the fore-wing cell, with the black ground-colour. Fringe black.

Beneath rather lighter; both the dark ground-colour and the orange belt varied with lighter and darker markings.

Head and thorax black; face, palpi, and abdomen orange; legs grey.

Hab. Pará; one example.

MESENE DEBILIS.

♂ & ♀. 10″. Similar to *M. Sagaris*, Cram. (Pap. t. 83. f. D), but very much smaller, and body much less robust. The fore-wing costa is gently arched, without incurvation; and the anal angle of hind wings is less prominent, and the middle of the outer margin rounded. Above dark brown, with indistinct submarginal darker spots; an oblique, subtriangular, common orange spot, beginning at the fore-wing median nervure and curving towards the base of hind wing; sometimes it is prolonged on fore wing nearly to the costa.

Beneath brown, prettily variegated throughout with ashy white, and with a yellow spot near inner margin of fore wing.

Body brown, abdomen in the ♂ orange. Palpi, forehead, and legs yellow.

Hab. Forests of the Tapajos.

MESENE CROCOSTIGMA.

♂. 1″ 3‴. Same shape as *M. Sagaris* ♂ (Cram. Pap. t. 83. f. D). Above dark brown, varied with obscure blackish transverse streaks. Hind wing with a large transverse oblong spot across the disk, rich orange.

Beneath black, richly glossed with blue.

Head, body, and legs black.

Hab. Tunantins, Amazons.

MESENE APOLECTA.

♂. 1″ 2‴. Similar in colour to *M. crocostigma*. Hind wing much less elongate from base to anal angle than in *M. Sagaris* ♂. Above dark brown, varied with obscure blackish spots, those near the outer borders forming a submarginal row. Fringe near apex of fore wing white, rest black. Hind wing with an oblong saffron-coloured spot across the disk and including the abdominal margin.

Beneath dark brown, with the darker spots much less distinct than above; the yellow spot of hind wing brighter than above.

Body brown.

Hab. Altar do Chão, R. Tapajos.

MESENE EUPTERYX.

♂. 1″ 2‴. Wings elongated and narrow, more so than in *M. Nola*, H.-Schäffer (Exot. Schmett. f. 23). Anal angle of hind wing rather less prominent than the rounded outer margin. Above vermilion-red; outer border of fore wing very narrowly edged with black; outer margin of hind wing rather more broadly edged with black, which in some examples is dilated into spots towards the anal angle; the black border extends round the apex to the costa, and round the anal angle a short way up the abdominal edge.

Beneath reddish ochreous; black margins a little wider; apical half of fore wing black, with a large buff spot in the middle.

Head, palpi, and legs yellow. Thorax and abdomen orange.

Hab. Pará and banks of the Tapajos.

MESENE NYDIA.

♀. 1″ 4‴. Possibly the ♀ of *M. eupteryx*, but the locality different. Wings elongated; above ochreous red, with a broadish outer and costal, and very broad apical, black border to the fore wing, and a broad indented outer border to the hind wing, extending a little along the costa and abdominal edge. The black apical part of the fore wing has a buff spot in the middle.

Beneath, the same.

Body orange; abdomen brown at the base; face, palpi, and legs yellow.

Hab. Ega.

MESENE PYRRHA.

♀. 1″ 2‴. Closely allied to *M. Nola*, H.-Schäff. (Exot. Schmett. f. 23), of which both sexes are nearly alike in colours and markings; above rich orange-red, with a buff spot near middle of outer border of hind wing; the apical third of fore wing is deep black, but the margin of the black is very irregular and very deeply sinuated in its lower portion; in the middle it has a large buff spot. The outer edge of hind wing is narrowly black and has three black marginal spots, one at the apex and two at and near the anal angle. Fringe black.

Beneath, the same.

Head and body orange; face, palpi, and legs yellowish.

Hab. Ega.

Genus PACHYTHONE, nov. gen.

This new genus is formed to include a number of species very similar in size and range of coloration to *Mesene*, but differing in the much more bulky thorax and abdomen, and especially in the abbreviated and thickly clubbed antennæ. The wing neuration is the same as that of *Mesene* and the allied genera; the palpi are very short, not passing the lower edge of the frontal pad; and the hind wings are broadly rounded, with the outer margin on about the same level as the anal angle. The antennæ scarcely reach to half the length of the costa of the fore wing; their shafts are brown, spotted obscurely with ashy or lighter brown. Eyes naked. The male fore legs are very short, the other legs are moderately elongate and clothed with short scales.

The species are very rare.

PACHYTHONE EREBIA.

♂. 1″ 2‴. Fore-wing costa incurved in the middle, sharply arched before the apex. Dark sooty brown, fringe white: above immaculate. Beneath paler brown, with a submarginal row of obscure darker spots and paler lunules on the hind wing.

Head, body, and legs sooty brown; tarsi white, tipped with black. Antennæ dark brown spotted with ashy; club thick, oval, black.

Hab. Ega. Resembles in colours *Mesene fuliginea*.

PACHYTHONE LATERITIA.

♂ & ♀. 1″ 3‴. Fore-wing costa very slightly incurved in the middle and gently arched before the apex. Above clear light brick-red, spotted with black, the outer margins also edged with black. The spots are elongated and arranged in two rows near the base, and on the outer half of both wings form three curved macular belts crossing the wings; one of them, passing a little beyond the cell, is more flexuous. Fringe black, costal border of fore wings brownish.

Beneath, the same, but paler, and the costa and apex of fore wing broadly bordered with brown.

Body above reddish, beneath whitish. Legs pallid. The antennæ in a well-preserved female example are dark brown ringed with ashy, and the club blackish; in a worn male the organs are pale rufous, obscurely ringed.

Hab. Tapajos and Ega.

PACHYTHONE DISTIGMA.

♂. 1″ 3‴. Fore wing elongate triangular, costa slightly incurved in the middle. Above dark brown, including the fringe; the hind wing with a transverse oblong tawny-orange spot between the cell and outer margin, and not reaching the abdominal edge. Fringe dark brown.

Beneath paler; in both wings a submarginal row of regular rounded blackish spots encircled with grey; orange spot of hind wings nearly obsolete.

Antennæ greyish, ringed with dark brown; club thick, ovate, black.

Body and legs dark brown; tibiæ and basal joint of tarsi whitish.

Resembles in colours *Mesene crocostigma.*

Hab. Pará.

PACHYTHONE XANTHE.

♂. 1″. Fore-wing costa very slightly incurved in the middle. Above saffron-ochreous; fore wing with the costal border, apical portion, and outer border black; hind wing with a rather narrow black outer border, attenuated in the middle and near the anal angle. The black apical portion of the fore wing has in the middle an oval saffron-coloured spot; the costal border has two triangular projections into the wing-cell. Fringe black.

Beneath, the same, but paler.

Head and terminal joint of the palpi dark brown; face, rest of the palpi, thorax, abdomen, and legs yellow.

Hab. Ega, Upper Amazons.

PACHYTHONE MIMULA.

♀. 1″ 3‴. Fore wing more elongated, costa incurved in the middle and arched again long before the apex; hind-wing outer border more advanced than the anal angle. Above dark brown; fore wing with a triangular yellow spot occupying the inner half of the basal portion, and an elongate yellow spot in the middle of the dark apical part. Hind wing with rather more than the basal half yellow, the colour occupying also a rather wide indentation in the dark brown outer border.

Beneath, the same, but paler.

Head and thorax brown; face, thorax, abdomen, and legs yellow. Antennæ brown, obscurely spotted; club more slender than in the other species.

Hab. Santarem, Amazons.

CHARIS MONOGRAMMA.

♂. 1″ 4‴. Similar in shape to *Ch. Cadmeis* (Hewits. Exot. Butt. *Charis*, f. 1); fore-wing costa broadly incurved in the middle, sharply arched before the apex, the latter produced and acute. Anal angle of hind wings a little produced, and, as well as the abdominal margin, fringed with long silky hairs. Above dark brown; both wings crossed by a rufous-tawny line extending from the middle of the fore-wing costa to the middle of the abdominal edge, where it is broader and of an orange tint. Fringe ruddy brown, white near the apex of fore wing.

Beneath, lighter and more ruddy, tawny line much broader. Antennæ and body dark brown, the former ringed with white. Eyes hairy.

Hab. On flowers, Santarem, Amazons.

The species differs from the hairy-eyed section of *Charis* in no structural character; but its coloration is unlike that of the rest of the genus.

CHARIS LYPERA.

♂. 1″ 6‴. Very similar in shape and colour to *Ch. Cadmeis*, Hewits. (Exot. Butt. *Charis*, f. 1). Above, dark brown, with a number of short black lines across the interneural spaces, some of them uniting to form a flexuous line across both wings a little beyond the middle, a submarginal plumbaginous line to both wings; outer border slightly rufous, with a row of black spots attached to the plumbaginous line. Fringe spotted alternately with white and brown.

Beneath lightish olive-brown, much paler on the outer borders. Black markings as above, but no plumbaginous line.

Head, body, and legs dark brown. Antennæ dark brown, obscurely spotted with grey. Eyes hairy.

Hab. Ega.

CHARIS ZAMA.

♂. 1″ 2‴. Fore wing elongate-triangular, costa very slightly incurved in the middle, arched before the apex, hind wing triangular. Above dark rusty brown, the interneural spaces crossed by blackish spots; two plumbaginous lines parallel to the outer margins, the space between which is reddish and marked by a row of black spots; fringe spotted with black and white.

Beneath rusty tawny; hind wing darker. Basal part of fore wing crossed by short dusky lines; near the apex a small black spot, followed by a minute plumbaginous dot. Hind wing marked with numerous clearer black spots, and with a continuous plumbaginous line.

♀. 1″ 2‴. Above rusty brown, lighter than in the ♂, marked with numerous black spots, and with two plumbaginous lines having a row of black spots between them.

Beneath rusty tawny, black spots as above, and with a continuous submarginal plumbaginous line on both wings.

Eyes hairy.

Common throughout the Amazons, and in other parts of Tropical America. I cannot find a recognizable description or figure of this common species in any published work.

CHARIS ARGYREA.

♂. 1″ 2‴. Fore wing with the costa incurved in the middle and strongly arched before the apex; the latter produced, acute. Above nearly black, with indistinct darker spots; two glittering submarginal plumbaginous lines and a row of black spots between them. Fringe black, that of fore wing with three white spots.

Beneath, the same; black spots rather more distinct; the outer plumbaginous line interrupted.

Eyes hairy.
Hab. Ega.

CHARIS VENILIA.

♀. 1″. Closely allied to *Ch. perone* (Doubl. & Hew. Gen. D. L. t. 71. f. 9), the sexes of which do not differ in markings. Wings of the same rich dark-yellow colour, with a glittering silvery-blue submarginal line, flexuous and interrupted on the fore wing and sometimes interrupted on the hind wing. Both wings sprinkled with a multitude of black spots, much larger than in *Ch. perone*, and of square shape; the spots unite near the apex and outer border of fore wing so as to form two thick irregular macular belts. Beneath paler, marginal silvery lines macular and partly obsolete.

Hab. Pará, Tapajos.

CHARIS GLAUCOPIS.

♂. 1″ 3‴. Allied to *Ch. trochilia*, West. Fore wing triangular, costa and outer margin very gently arched, apical angle distinct; hind wing gently rounded outwards. Above black; base of fore wing and abdominal border of hind wing marked with oblique confluent dark red spots; a line very near the outer margin glittering silvery blue; the fore wing has a broad belt a little beyond the middle, commencing at the subcostal, of a rich cobalt-blue colour; two spots within the cell, and one beyond the belt, of the same hue; outer margins rufous, fringe dark brown.

Beneath dark brown, outer margins rufous, silvery lines interrupted. Numerous large quadrate black spots lie across all the interneural spaces; on the fore wing they are margined with blue-grey, and on the hind wing the spaces between the spots are wholly blue-grey.

Body dark brown; face yellowish; abdomen rufous at the base.

Hab. Ega.

SYMMACHIA AMAZONICA.

♂. 1″ 7‴. Closely allied to *S. colubris*, Hübn. (Zutr. f. 251–2), a species of Southern Brazil. Above dark brown; a triangular space at base of fore wing, a broad belt across the middle of same wing (widest at costa), and a broad abdominal border to hind wing densely clothed with glittering golden-green scales. Between the two green patches of fore wing are two dusky bars and two spots; the belt is also margined externally by a black line. Near the apex of the fore wing is a red spot surmounted by a silvery one, and connected with a plumbaginous submarginal line, between which and the outer border is a row of short dusky lines. In the hind wing the submarginal line is golden green, and does not reach the apex; it is followed by a rufous streak, in which is a row of short black lines.

Beneath blackish brown, with a slaty gloss, and indistinctly barred on the hind wing with black. There is a large crimson spot within the base of the fore-wing cell, and five or six irregular plumbaginous spots more or less near the costa, and placed at intervals from base to apex.

The shape of the hind wing varies greatly, the outer margin being sometimes quite straight and sometimes regularly rounded.

♀. 1″ 7‴. Same disposition of metallic belts and lines as in ♂: ground-colour lighter, purplish brown, and black cross bars thicker. The outer margins of both wings are rounded outwards, and the anal angle is not produced.

Beneath rich brown, with 4 or 5 dusky bars, the basal ones on hind wing macular. The fore-wing costa has a broad orange border, in which, at regular intervals from base to apex, are six rather large but irregular glittering plumbaginous patches. There is a submarginal row of black dots to both wings, and an ochreous outer border to hind wing.

Hab. Ega; settling on moist sandy margins of the lake, with wings extended.

CALYDNA ARGIELLA.

♂. 1″ 3‴. Wings not angulated; fore-wing costa very slightly and broadly incurved in the middle; outer margin nearly straight; apical angle acute; outer margin of hind wing gently rounded; anal angle not prominent, obtuse; fringe dark brown spotted with white. Above darkish brown, with a large number of dusky spots and a submarginal row of the same encircled with paler brown.

Beneath lighter brown than above; black spots more distinct, oblong or rounded, each encircled by an ashy ring.

Eyes naked. Antennæ with a much elongated black club; shaft ringed with white.

Hab. Brazil.

CALYDNA TINEA.

♀. 10‴. Very small; differs from *C. euthria* and allies in the costa of the fore wing being regularly arched from base to apex; the latter is slightly produced and acute; the outer margin rounded outwards in both wings, and in the hind wing more advanced than the anal angle. Fringe alternately spotted with brown and whitish.

Above dark brown, varied with numerous quadrate dusky spots edged with pale brown. There is a row of more rounded spots near the outer margins, preceded by a line of pale-brown lunules.

Beneath not lighter than above, the spots more distinctly margined with pale brown; submarginal spots large, oval and black.

Eyes naked.

Hab. Pará.

CALYDNA MACULOSA.

♀. 1″ 1‴. Wings rather broad, same shape as in *C. cabira*, ♀ (Hewits. Exot. Butt. *Calydna*, f. 6), but the apex of fore wing not so much produced, and hind wing not so angular. Above tawny brown, with a large number of quadrate dark-brown spots, margined with tawny yellow, and also marked with numerous smaller, whitish spots, one within the cell of each wing, one under the origin of the first median branch, and a flexuous row of 7 or 8 extending across the wings beyond the cell. Fringe brown, spotted with lighter brown.

Beneath lighter, ochreous brown, with the nervures ochrey-yellow; spots same as above, but the submarginal row are alternately larger and darker.

Hab. St. Paulo, Upper Amazons.

CALYDNA MICRA.

♂. 1″. Near *C. euthria*, Dbldy. (Dbldy. & Hewits. Gen. D. L, pl. 70. f. 10), but quite distinct. Outer margins of the wings dentate, as in the majority of the species; the dentations fringed with black, the sinuses with white. Fore-wing costa incurved in the middle, sharply arched before the apex, the latter produced, acute.

Above dark sooty-brown, sprinkled irregularly with tawny atoms, and having numerous amorphous black spots and patches, besides a flexuous submarginal row of more regular black spots edged with reddish tawny; the wings are also marked with a few shining, narrow, white specks—one, more conspicuous, within the cell of each wing, and four or five, smaller, on the apical half of the costa of fore wing.

Beneath, the same, but paler, and with more pale atoms and distinct rufous rings.

♀ same shape and size as ♂, but paler, the upper- and undersides almost exactly resembling the underside of the opposite sex.

Hab. Dry forests of the Tapajos and Villa Nova, Amazons.

Genus BŒOTIS (Hübn.).

A group of small species resembling the broader-winged species of *Mesene* (*M. Ærope*, &c.) in outline, and agreeing with *Charis* in the possession of a shining plumbaginous submarginal line on the wings. They differ from both genera in the palpi being more elongate, the slender tips being visible beyond the forehead when viewed from above. The neuration offers no peculiarity; but the colour-pattern of the wings is very similar in the four known species, and indicates a natural group. A marked feature is the broadly rounded hind wings, the outer border of which is much more advanced than the anal angle. The eyes are naked.

Papilio hisbon, Cramer, belongs to the genus. It is sometimes seen on flowers in thinned woods in "campo" districts, and elevates and depresses its wings, when settled, like the *Calydnæ*. The other species hold their wings extended, like the *Nymphidia*.

BŒOTIS EUPREPES.

♂. 1″ 3‴. Same form as *B. hisbon* (Cramer, Pap. t. 83. f. C), rather larger, and differing from all the varieties of that species in the first ochreous belt being distant from the base of both wings. Colour above dark brown, crossed by three narrow yellow belts, each continuous and uniform, but the middle one rather broader than the others. A submarginal plumbaginous line; above the anal angle and near the costa of hind wing are large spots of the same hue.

Beneath paler, the third yellow belt furcate near its termination at the hind angle of each wing; base of wings also yellow. Fringe dark brown, with three white places in each wing.

Hab. Forests of the Tapajos.

BŒOTIS PRIMA.

♂. 1″ 7‴. A larger and more robust species. Above dark brown, wings with a narrow basal streak occupying the abdominal edge of hind wing, an oblique central belt, and a narrow subapical line, ochreous yellow, a plumbaginous submarginal line, and on the hind wing spots of the same hue near the anal angle and apex.

Beneath paler, with the addition of a fourth yellow belt near the base; the outermost belt of the hind wing is bifurcate at the anal angle.

♀. Paler than the ♂. Yellow belts broader and four in number on the fore wing by the addition of a short subbasal streak. Beneath, this additional belt is continued on the hind wing.

Hab. Banks of the Tapajos, and at Ega.

METACHARIS CUPARINA.

♂. Allied to *M. Nicaste* (Herr.-Schäff. Exot. Schmett. f. 47, 48), wings considerably broader. Above ruddy brown, with a rich violet gloss; black markings much less distinct, and obsolete on the outer halves of the wings; submarginal plumbaginous lineoles and spots the same.

Beneath tawny brown glossed with violet; submarginal black spots obsolete, except the apical one on each wing.

Hab. Banks of the river Cupari, Tapajos.

METACHARIS NIGRELLA.

♂. Also allied to *M. Nicaste*, and more closely to *M. regalis*, Butler (Entom. Month. Mag. iii. p. 174). Above dark brown, nearly black, faintly glossed with slaty blue; black marks indistinct.

Beneath rich glossy violet, without any distinct black marks or spots.

Hab. Banks of the Cupari, Tapajos.

METACHARIS (ECHENAIS) EXIGUA.

♀. 10‴. Allied to *Echenais Chia*, Hübn. (Zutr. f. 357, 358), but apparently not its female, as the markings of the underside are very different. The wings are rounded, with obtuse apical angle to fore wing. Above brown, variegated throughout with subquadrate darker brown spots, and with a less number of orange-coloured spots of the same size between them; a regular submarginal row of darker spots edged with tawny orange.

Beneath, the ground-colour is tawny yellow, with the black spots as above.

Hab. Forests of the Tapajos.

Genus LASAIA, nov. gen.

This new genus is founded on species having a close relation to the hairy-eyed sections both of *Charis* and *Calydna*, but differing from both in the slender tips of the palpi projecting beyond the forehead.

L. MERIS, Cramer, Pap. pl. 366. f. B, C. Tropical America.

L. CLEADAS. Charis Cleadas, *Hewits. Exot. Butt.* Charis, f. 10.

Hab. Dry woods of Santarem, on the Tapajos, Amazons.

THAROPS SUPERBA.

♂. 1″ 10‴. A very robust species, closely allied to *Th. splendida*, Butler (Journ. Linn. Soc. vol. ix. p. 224). Differs in the fore wing being more obtuse at the apex, and in the hind wing being much more advanced and broadly rounded in the apical portion, thus rendering the outer margin less oblique thence to the apex. Above, it is of a metallic light green colour, with pure cerulean blue on the disk and costal part of hind wing; the costal and apical borders are broadly blackish-brown, and with the borders are blended the black marks of the wing-cell.

Beneath ochreous rusty, with the inner half of the fore wing and disk of hind wing whitish, marked with dusky or rustyspots.

Hab. Villa Nova, Amazons.

LEMONIAS MELIA.

♀. 1″ 4‴. Resembles *L. cerealis*, Hewits. (Exot. Butt. Lem. f. 37), shape of wings the same. Above pale straw-colour, base of fore wing crossed by two rows of oblong blackish spots; and then follows a broad, clear, straw-coloured band; and the whole outer border is broadly black, with a slender line of straw-colour running through it, followed by two short streaks near the hind angle. The hind wing is crossed by seven broadish slightly waved black belts, of which the 3rd (from the base) is much abbreviated, and the 6th macular. Fringe alternately black and white.

Beneath, the same, except that the black belts of the hind wings are broken into spots.

LEMONIAS CAMPESTRIS.

♂ & ♀. 1″ to 1″ 4‴. Closely allied to *L. Epulus* (Cram. t. 50. f. C, D). Differs in the wings being of a light reddish-tawny hue and destitute of pale spots. The base of the fore wings is crossed by oblong dusky spots, as in *L. Epulus*; and beyond the middle are two broadish, irregular, flexuous, dusky bands, followed by a clear reddish-tawny belt continuous from the costa to the hind margin, the outer margin being dusky brown. The hind wings are generally reddish tawny, without distinct black markings (although these are sometimes faintly apparent as macular belts), except the submarginal row of blackish spots.

This species was the prevalent form on the extensive natural "campos" of the Tapajos. *L. Epulus* is common in all waste, open grounds near towns, on the Amazons.

LEMONIAS PIONE.

♂. 1″ 6‴. Slaty greenish, silky, shining, above and beneath. Fore wing triangular; costa incurved in the middle; apex acute, slightly produced, outer margin nearly straight. Hind wing gently rounded outwards. Both wings crossed above and beneath by a large number of short blackish streaks in the interspaces of the nervures, and having a submarginal row of black spots. Fringe blackish, except a white spot near the apex of the fore wing.

Head, body, and legs dark brown.

Hab. Pará. Bears some resemblance in form and markings to *L. ocypore* (Geyer in Hübn. Zutr. f. 989, 990), which is probably an *Emesis.*

LEMONIAS GALENA.

♂ & ♀. 1″ 9‴. Wings rather short and broad. Fore-wing costa nearly straight in the middle, arched just before the apex, the latter acute. Above dark reddish-ochreous; both wings with three short black streaks across the cell, two below the median nervure, and a flexuous line of similar streaks beyond the cell; outer border darker, reddish, with a faint row of whitish lunules running through it; outer margins black; fringe dark brown, with paler spots.

Beneath lighter tawny ochreous, passing to whitish over the basal portions. Basal spots of fore wing encircled with tawny white. Hind wing with a marginal row of dark rusty spots, darker near the anal angle, and surmounted by whitish lunules, a short row of similar spots towards the hind angle of fore wing.

Common throughout the Amazons. Also found at Cayenne.

LEMONIAS SIAKA, Hewits. Exot. Butt. Lemon. f. 10, 11.

♀. Size and shape of ♂ (fig. sup. cit.) except that the outer margins of the wings are more rounded. Above dark brown; both wings crossed by a tawny belt, beginning beyond the middle of the fore-wing costa, curving to near the hind angle, and prolonged as a submarginal stripe on the hind wing, where it assumes a deeper orange hue.

Beneath paler; belts as above; a few obscure blackish spots on the basal portions of the wings.

Hab. Ega, in company with the male.

LEMONIAS APOTHETA.

♂. 1″ 3‴. Wings rather short and broad, as in *L. Galena.* Fore-wing costa nearly straight until before the apex, towards which it is curved; the apical angle distinct; outer margin very slightly rounded. Hind-wing outer margin broadly and subangularly rounded. Above darkish ochreous brown; wings crossed by a few short slender darker-brown streaks, outer border tinged with rufous and marked with a regular row of blackish spots edged with whitish.

Beneath greyish white, becoming brown on the apical half of fore wing; dark-brown spots and lineoles as above; the submarginal row of spots on the hind wing surrounded by slender brown circumflexes.

Hab. Brazil.

LEMONIAS HEMILEUCA.

♂. 1″ 6‴. Allied to ♂ of *L. Aristus*, Stoll, and *L. Aminias* (Hewits. Exot. B. Lem. f. 29), but a more robust species, with prominent anal angle to the hind wing, like *L. Penthea,* Cramer. Fore-wing costa straight, except just before the apex, where it is curved, the apical angle being produced. Above ruddy brown, shining; the basal half of the fore wing crossed by seven black lineoles, which are not margined with paler colour; beyond the cell a patch of bluish grey enclosing a transverse series of shorter black lineoles; a submarginal row of grey circles enclosing spots of the ground-colour of the wing. Hind wing with the apical half white, with submarginal black spots. Basal half crossed by black lineoles, and beyond the cell by a streak of blue-grey in which is a flexuous row of black spots.

Hab. Pará. Apparently quite distinct from all the numerous varieties of *L. Aristus.*

LEMONIAS LAMPROS.

♂. 1″ 1‴. A small, slender species, with somewhat elongated wings and the anal angles of the hind pair not more advanced than the tip of the abdomen. Fore wing dark purple-brown, with a few obscure blackish lineoles and a submarginal row of blackish spots; glossed with dark violet-blue; hind wing entirely glossy violet-blue.

Beneath pallid brown, with a number of dark-brown spots and lineoles; of these there are two spots in the cell of both wings, a slender lineole across the end of the cell, and two below the median nervure, a flexuous row of spots beyond the cell, and a dusky belt between them and the submarginal row.

Hab. Ega and St. Paulo, Upper Amazons.

NYMPHIDIUM OCHRA.

♂ & ♀. 1″ 7‴ A very distinct species, allied to *N. Agle*, Dbldy. (Hewits.

Exot. Butt. Nymph. f. 3); shape of wings the same. Above clear dark brown without any admixture of rufous; the whole central area of both wings occupied by a large pale-ochreous patch, or broad belt, extending obliquely from the upper radial nervure of the fore wing, across the lower apical portion of the cell, to the abdominal edge of the hind wing; the ochreous area leaves a brown border rather narrower than that in *N. Agle*, and quite even on its edges, except within the fore-wing cell. Down the centre of the fore-wing outer border runs a pale-ochreous line, double as it approaches the hind angle; on the hind wing there is a chain of ochreous circles enclosing blackish spots. Fringe dark brown.

Beneath, the same as above, but paler, especially the brown borders.

Abdomen of the male yellow, except at base, where it is brown like the thorax; in the female it is brown above.

Hab. Ega and St. Paulo, Upper Amazons.

NYMPHIDIUM FULMINANS.

♂. 1″ 9‴. Allied to *N. Lysimon*, Stoll (Suppl. Cram. pl. 39. f. 1); differs in the wings being free from red streaks, and in the marginal grey arched lines assuming very elongated acute-angular forms. Above dark brown, centre of both wings traversed by a very oblique white belt, which begins with the fringe in the middle of the fore-wing outer border, passes at a distance from the cell, and gradually widens to the abdominal edge of hind wing. In the fore-wing cell, and below the median nervure, are the usual grey lines forming parallelogramical figures; and there is a row of shorter marks between the cell and the apex, and along the upper edge of the white belt. The marginal arched lines do not differ on the fore wing from those of *N. Lysimon*; on the hind wing they are so much elongated as to form acute-angular figures, the third from the anal angle being much longer than the others.

Beneath, the same, but paler, the brown margins mixed with grey. Fringe of hind wings above dark brown. Abdomen white in the middle.

♀. Same colours and markings as the ♂, but wings elongated and similar in shape to those of *N. Mantus*, Cram. (Pap. t. 47. f. F, G); the white on hind wing narrow, similar to that of *N. Mantus*.

Hab. Banks of the Tapajos and at Villa Nova (Villa Bella), Amazons.

NYMPHIDIUM CHIMBORAZIUM.

♂. Closely allied to *N. Lysimon*, Stoll (Suppl. Cram. pl. 39. f. 1); differs in the hind wing, only, having near the anal angle a short red stripe. Above dark brown; fore wing with a triangular white spot, its apex on the middle of the terminal branch of the median nervure; hind wing with a broad white belt across the disk. The usual pale figures in the cell of the fore wing are of broadish oblong shape; the marginal semicircles on both wings are similar to those of *N. Lysi-*

mon, but they are less arched on the hind wing. The red belt within the brown margin of the hind wing ends abruptly at the median nervure, and it also differs from that of *N. Lysimon* in being indented by three black lunules which surmount the marginal semicircles. It occupies nearly the whole width of the brown border.

Hab. Valleys west of Chimborazo, alt. 3000 ft. (*Dr. Spruce*).

NYMPHIDIUM RUBIGO.

♂. 1″ 6‴. Same form of wings as *N. Pelops* (Cram. t. 170. f. F). Fore-wing costa incurved in the middle, and arched before the apex. Above light rusty brown, with a large triangular spot on fore wing, and whole central area of hind wing pure white. The rusty-coloured borders thus left are of moderate width, as in *N. Pelops*; the usual spots in the cell are also rusty reddish and obscure; the marginal slender curved marks are whitish and form small semicircles. Beneath, the same, but paler. Head and thorax above rusty brown, rest of body white. Antennæ rusty brown, with ashy-white rings.

Hab. Banks of the Tapajos.

NYMPHIDIUM MESOLEUCUM.

♀. 1″ 7‴. Closely allied to *N. Calyce*, Felder (Wien. entom. Monats. 1862, p. 72); differs in the borders of the wings being dark brown, destitute of bluish grey on the margins, and in the fore wing having a submarginal whitish streak extending to the costa. Above dark brown, with the usual dark spots ringed with grey near the base of fore wing. Central portion of the wings occupied by a broad belt of pure white, commencing at the fore-wing subcostal, crossing the lower corner of the cell, and extending to the abdominal margin of the hind wing. The dark-brown outer borders have not a distinct rufous streak as in *N. Calyce, Molpe*, and allied species; and the marginal row of black spots is distinct and uniform, edged on the inner and outer sides with whitish; on the fore-wing the spots are encircled with whitish, and a white streak extends from them to the costa.

Beneath, the same, but much paler, and marginal spots of hind wing irregular both in size and colour.

Hab. Baranquilla, New Granada.

NYMPHIDIUM EUTRAPELA.

♂ & ♀. 1″ 7‴. Closely allied to *N. Ninias*, Hewits. (Exot. Butt. Nymph. f. 22); differs in the fore wing having a broadish dark-brown costal border. The wings, especially in the ♀, have the same broad obtuse outline as in *N. Ninias*. Above dark brown, nearly black; central area of fore wing and the whole of the hind wing, except the outer border, pure white. The edge of the costal border of the fore wing is marked, inside the cell, with several fine transverse streaks; and the much broader outer border has two rather deep indentations. It has near the hind angle of both wings a narrow streak of red; but this is sometimes wanting. The marginal row of slender grey curved lines form a series of semicircles.

Beneath, the same, except that the outer border of fore wing has three, and of the hind wing two white patches.

The fringe is blackish, with three white places on the fore, and two on the hind wing. The abdomen is wholly white in both sexes.

Found at various places on the Amazons—Pará, Ega, and Tunantins. It seems intermediate between *N. Chione* (Bates), and *N. Ninias*.

NYMPHIDIUM HELIOTIS.

♀. 1″ 6‴. Wings broadly rounded. Above pale ochreous yellow, with a slight tawny tinge; base of both wings dark brown, which colour extends along the edge of the costa; outer borders dark brown, broad near the fore-wing apex, rather narrow and uniform on the hind wing. The marginal row of pale lines form a series of curves from the apex of fore wing to the anal angle of hind wing.

Allied to *N. Cachrys*, F. (*Damon*, Stoll, Suppl. Cram. pl. 39. f. 5) and *N. Ascolia*, Hewits. (Exot. B. Nymph. f. 4), but distinct.

Hab. Ega.

Genus EUERYCINA, Saunders, Trans. Ent. Soc. vol. v. 2nd ser. p. 97.

This genus was simply indicated by Mr. W. W. Saunders (*loc. cit.*) as a section of the genus *Erycina*, without characters. It is distinguished from the true *Erycinæ* by the second branch of the fore-wing subcostal being emitted before the end of the cell, as in the group of genera allied to *Nymphidium*. The palpi project beyond the forehead; and the antennæ are partially ringed or spotted with paler colour, besides being rather more slender than in *Erycina* and *Diorhina*. These characters show that its place is near *Lemonias*; and the style of coloration points to an affinity with *L. Irene*, *siaka*, and allies, notwithstanding that the hind wing is produced into a long tail.

EUERYCINA CALPHARNIA, Saunders, Tr. Ent. Soc. v. 2nd ser. pl. 20. f. 7.

Hab. Upper Amazons.

The flight is exceedingly rapid; and it settles on the under surface of leaves with its wings expanded.

ARICORIS GELASINE.

♂. In size and form agreeing with *A. Lagus* (Cramer, t. 117. f. F, G). Above of a more violaceous and darker hue, with a whitish discal spot traversed by the first median branch. Beneath also very similar to *A. Lagus*, differing chiefly in the base of the costa of hind wing having a saffron-yellow spot extending to the costal nervure.

♀? Resembles *A. Myrtis*, Doubldy. (Westw. in D. & Hew. Gen. D. L. p. 450). Dark blackish brown, with a large spot near the base of fore wing (including the hind margin) and a short broad fascia in the apical portion ochreous yellow; the whole basal area of hind wing also ochreous yellow, leaving only a moderately broad dark outer border. Beneath, the yellow colour is of the same hue; but the brown portions are much lighter and of a silky glossiness. The outer border of the hind wing has a row of six or seven semicircular white spots.

Both sexes, as above described, occurred at Ega, Upper Amazons, where neither *A. Pythia*, Hewits., nor *A. Myrtis*, Doubldy., was found. The two latter inhabit together the banks of the Tapajos and Lower Amazons; and I think I am not wrong in considering them sexes of one species.

ARICORIS VELUTINA.

♀. Same form and size as *A. Epitus* ♀ (Cram. t. 270. f. C); differs totally in colour. Dark brown, with a violaceous gloss, paler towards the outer margins. Fore wing crossed by an oblique broadish orange-yellow belt, extending from the costa to the outer margin near the hind angle.

Beneath brown, nervures paler; outer border of hind wing very pale brown, nearly white, except the brown nervures; orange belt of fore wing lighter in colour.

♂. The male is a fine insect, with elongated hind wings, like *A. Epitus* ♂ (*Cataleuca*, Herr.-Schäff. Exot. Schmett. f. 28, 29). Above, it is black, with the whole central area and hind limb of the fore wing, and outer border of hind wing, rich glossy dark blue. Beneath, it is dark brown, with much darker nervures and paler outer border; a basal streak in the fore wing and costal spot beyond the end of the cell are also light brown.

I found the species only at St. Paulo, Upper Amazons.

ARICORIS DISPARILIS.

♂. 1″ 4‴. Similar in form to *A. Lagus*; above dark brown, with the discal areas of the wings glossy violet-blue; fore wing with a large oval white spot in the centre.

Beneath, differs from all the allied species hitherto described, in the base of the hind wing having a large irregular orange-coloured spot covering the basal portions of all the nervures. The fore wing is brown, nervures concolorous, with two whitish streaks at the base, and the large central white spot as above. The hind wing is violet-brown, nervures darker, with a whitish streak in the cell, and elongated submarginal whitish spots between the nervures.

♀ 1″ 3‴. Similar in shape to *A. Myrtis*. Above dark brown, with the basal third of fore wing (except the costa) and basal half of hind wing orange. The orange-coloured portion of the hind wing is deeply indented by the black border near the costa, and its hind margin is festooned. The fore wing has in the middle of the black apical portion a short white belt.

Beneath, the same, except that the brown outer border of the hind wing has a series of five triangular whitish spots.

Hab. Forests of Cuparí, Tapajos.

ARICORIS FLAMMULA.

♂. 2″. Fore wing triangular; hind wing with the anal portion broadly produced and its margin tridentate. Above purple-black, with a broad streak in the middle of the hind border of the fore wing, and the whole discal area of the hind wing, rich scarlet; a white belt crosses the apical portion of the fore wing; the abdominal border of the hind wing is tawny yellow.

Beneath pale brown; a streak at base of costa of fore wing tawny white; belt white. Hind wing with the abdominal border broadly rufous tawny; disk whitish; outer border darkish brown, with a submarginal yellow streak, broad at the anal angle and terminating before reaching the apex; margins edged with white; fringe blackish.

♀. 2″ 2‴. Similar in colours to *A. Epitus*; fore-wing apex produced, and outer border much less rounded. Hind-wing outer border not produced near the anal angle, but tridentate, as in the ♂. Above dark brown, basal portions of both wings tawny orange; fore wing crossed a little beyond the middle by a broadish yellow belt. Hind wing with a row of three yellowish spots towards the outer margins.

Beneath tawny; brown portions of a tawny-brown hue; outer border of hind wing with a broadish yellow belt, and margin white as in the ♂.

Wings vertical in repose, as in the rest of the genus.

Hab. Banks of the Tapajos, and at Ega.

THEOPE SERICEA.

♂ & ♀. 1″ 6‴; 1″ 8‴. Shape of wings as in *Th. pedias* (Herr.-Schäff. Exot. Schmett. f. 24, 25); larger and stouter, black, a large area of the fore wing, occupying the disk and middle of hind margin, and whole of hind wing (except the margins, costal borders, and sometimes a discal spot), dark blue, slightly shining.

Beneath, in the ♂, rich golden-yellow, with a silky gloss; in the ♀, paler yellow, but glossy.

The blue area of the fore wing leaves a very broad costal and apical black border, but a very narrow outer border towards the hind angle. In the ♀ the blue is more contracted in its limits.

Hab. Pará and Tapajos.

THEOPE LAMPROPTERYX.

♂. 1″ 6‴. Same form as *T. pedias* (*i. e.* hind-wing outer border nearly in a line with the apex of abdomen). Above, fore wing black; a small spot at the base, and the whole of the hind wing, except the margins, rich glossy dark blue.

Beneath ochreous yellow, moderately shining.

Hab. Santarem, Lower Amazons.

THEOPE HYPOXANTHE.

♂. 1″ 6‴. Closely allied to *Th. pedias*, Herr.-Schäff. (Exot. Schm. f. 24, 25). Fore-wing costa more strongly arched near the base, nearly straight from beyond the middle to the apex; the latter rectangular, with the outer border rounded only from the middle to the hind angle. Hind-wing outer border nearly in a line with the apex of abdomen. Above black, with fore-wing costa and the fringes lightish brown; a large spot, occupying more than the basal half of the fore wing (except a broad costal border) and the whole of the hind wing (except a narrowish outer border), glossy blue.

Beneath yellow, without gloss.

♀. Same form as the ♂. Blue colour less glossy, and contracted in area on the hind wing by a broad costal black border, and on the fore wing by the costal border becoming suddenly wider at the end of the cell.

Beneath yellow, without gloss, as in the ♂.

Hab. Pará.

THEOPE SOBRINA.

♀. 1″ 5‴. Closely allied to *Th. Thootes* (Hewits. Exot. Butt. *Theope*, f. 9, 10); the fore-wing costa very abruptly arched from the base. Basal half of the fore wing and the whole of hind wing, except the costal borders and outer margins, glossy blue, more violaceous than in *Th. Thootes*; the blue area of fore wing deeply bisinuated, as in *Th. Thootes*.

Beneath, differs from *Th. Thootes* in being of a brownish golden tawny hue, glossy. In *Th. Thootes* the ♀ is of the same brown colour beneath as the ♂.

Hab. Forests of the Tapajos, Amazons.

THEOPE APHELES.

♂ & ♀. 1″ 3‴ Also closely allied to *Th. Thootes*, Hewits.; smaller, but wings of the same shape; the fore-wing costa very strongly arched at the base, and slightly arched near the apex, which is a little produced in both sexes. Colour lighter blue; the blue area of fore wing bisinuate, as in *Th. Thootes*, and of the same extent.

Beneath very light brown.

Hab. Upper Amazons.

THEOPE ZOSTERA.

♀. 1″ 5‴. Very similar to *Th. Thootes* in shape and colours above; but the blue of the fore wing is of greater extent, leaving only a broad apical border deeply indented in the middle.

Beneath tawny-yellow, with an obscure brownish belt across the disk of both wings beyond the middle.

Hab. St. Paulo, Upper Amazons.

THEOPE AUREONITENS.

♂. 1″ 2‴. Fore-wing costa gently curved, apex obtuse; outer margins of both wings regularly rounded. Above glossy blue, with a costal and outer brown border to the fore wing only, of small width; apical half of the disk with a large round opaque light-brown spot.

Beneath, lustrous golden-yellow.

♀. 1″ 2‴. Wings of the same rounded outlines as in the ♂; above dullish brown, spotless; beneath straw-yellow without gloss.

Hab. Ega, Amazons.

THEOPE HYPOLEUCA.

♂ & ♀. 1″ 2‴. Fore-wing costa arched near the base, thence very gently curved to the apex, apical angle subobtuse, outer margin very gently rounded. Above blue (similar to *Lycæna alexis*); fore wing with a narrowish costal border, and very broad outer border, black; hind wing very narrowly edged with blackish.

Beneath very light-brown, nearly white.

Hab. Santarem, Amazons.

THEOPE EXCELSA.

♂. 1″ 10‴. A large robust species. Fore-wing costa very slightly arched near the base and apex, in the middle straight; outer margin gently curved outwards; hind wing lengthened in its anal portion; outer margin nearly straight from anal angle to the apex.

Above dark blue, slightly glossy, nervures blackish; fore wing with a broadish costal and outer border, hind wing with a costal border, black.

Beneath deep rich yellow, slightly glossy.

Hab. Ega.

THEOPE AZUREA.

♂. 1″–1″ 3‴. Fore wing triangular, with costal and outer margins nearly straight, and apex acute. Hind-wing outer margins gently rounded. Above fine glossy blue; costa of fore wing with a narrowish, outer margin with a broad dark-brown border, very broad at the apex. Hind wing very narrowly edged with dark brown. Fringe pale brown.

Beneath light tawny-brown, spotless.

Hab. Ega and Fonte Boa, Upper Amazons.

THEOPE SIMPLICIA.

♂ & ♀. 1″. Fore wing triangular; costa slightly arched near the base and apex, apical angle distinct, outer margin nearly straight; hind wing subtriangular. Above, fore wing brown, spotless; hind wing lilacine blue, costal border narrowly brown. Hind wing in ♀ with basal portion above brown.

Beneath very light brown, nearly white, spotless.

Hab. Pará, common.

THEOPE LYCÆNINA.

♂ & ♀ 1″–1″ 3‴. Fore wing triangular; costa gently arched, apex obtuse, outer margin of both wings slightly rounded. Above black, with discal area of both wings dark blue, scarcely shining, leaving blackish borders very indistinctly limited from the blue.

Beneath very light brown, nearly white; hind wing with a submarginal row of dusky spots, distinct only towards the anal angle.

Fringe light brown.

Hab. Pará and Santarem, Lower Amazons.

THEOPE FOLIORUM.

♂. 1″ 2‴–1″ 4‴. Fore wing triangular; costa arched near the base, then straight until just before the apex, where it curves down to the acute apical angle; outer margin straight; outer margin of the hind wing gently rounded. Above, fore wing black; with a discal spot, touching the hind margin and embracing about one-third of the surface, dull blue, sometimes obscure with blackish scales. Hind wing light blue, with ill-defined costal and apical brown border, outer edge dark brown, with a submarginal row of black spots edged with whitish. Fringe pale brown or white.

Beneath very light brown, nearly white. Hind wing with a row of black spots towards the anal angle.

♀. Fore wing much less acute at the apex, and outer margins rounded. Hind wing broadly rounded, as much advanced as the anal angle. Above brown, with the blue patch and marginal black spots of the hind wing as in the ♂. Beneath, the same as in the ♂, except that the black spots of hind wing form a continuous row from anal angle to apex.

Hab. Pará and Santarem, Lower Amazons; a common insect.

THEOPE PUNCTIPENNIS.

♂ & ♀. 1″ 3‴. Fore wing triangular; costa slightly arched, apical angle subobtuse; outer margins gently curved outwards, less so in the ♂ than in the ♀. Above dark brown, a patch of light greyish blue on the inner portion of the fore wing near the base in the ♂, very indistinct in the ♀. Hind wing in the ♂ greyish blue, outer edge brown; in the ♀ brown, tinged with blue towards the base; a submarginal row of blackish dots in both sexes. Fringe light brown, nearly white.

Beneath very light brown, sometimes nearly white; a submarginal row of blackish dots in both wings.

Hab. Tapajos and Ega, Upper Amazons.

Differs from *Th. foliorum* only in the lighter shade of blue and the row of submarginal spots beneath in both wings.

THEOPE ATIMA.

♂. 1″ 3‴. Fore wing triangular, costa slightly arched, nearly straight in the middle, apical angle distinct. Above black. Fore wing with the cell and several longitudinal streaks blue; hind wing with the discal and inner portions blue, traversed by black nervures; a submarginal row of black dots. Fringe dark brown.

Beneath brown, hind wing with a submarginal row of black dots.

Hab. Ega.

Differs from *Th. foliorum* in the streaks of blue of fore wing above, and in the much darker hue of the under surface.

THEOPE LEUCANTHE.

♂ & ♀. 1″. A small delicate species; costa of fore wing slightly arched towards the base, scarcely arched near the apex; outer margin of hind wing regularly rounded in both sexes. Above, fore wing brown, spotless. Hind wing light greyish blue, the base in the ♂ and a broad costal border in the ♀ brown; outer margin narrowly edged with brown, and with a submarginal row of dusky specks encircled with paler grey.

Beneath ashy white; a submarginal row of black specks surrounded by purer white on both wings.

Hab. Pará and Santarem, Rio Tapajos.

THEOPE TETRASTIGMA.

♂ & ♀. 1″ 2‴. A slender species with elongated fore wings. The fore-wing costa is slightly arched near the base and apex, the latter distinctly produced; the outer margin bowed outwards towards the hind angle, very strongly so in the ♀. Hind wing small, subtriangular. Above dark brown, spotless; fringe concolorous. Beneath darkish brown, with a short pale streak across the end of the cells of both wings, and a submarginal row, in both wings, of black spots encircled by pale brown.

Hab. Forests of the Cuparí and R. Tapajos, Amazons.

THEOPE METHEMONA.

♂. 1″ 6‴. Fore wing triangular, costa arched towards the base and apex, straight in the middle; outer margins nearly straight. Above black, with the disk and base of both wings occupied by a large, common, shining blue patch, leaving somewhat regular and broad black borders. Fringe dark brown.

Beneath very light brown, with a submarginal row of small black specks on both wings.

Hab. Santarem, Amazons.

THEOPE CÆRULEA.

♀. 1″ 6‴. Closely allied to *Th. Virgilius*, Fab. (E. S. iii. 1. 323. 226), which is found in Honduras and Nicaragua. Fore-wing costa strongly arched near the base, incurved in the middle and gently arched at a distance before the apex. Above dark brown, basal half of fore wing and whole of hind wing, except the brown apical portion, light cærulean blue; the brown apical portion of fore wing has also in the middle a blue spot. The hind wing has a submarginal row of dusky longitudinal lineoles, and the nervures are dark in colour. Fringe dark brown.

Beneath rufous tawny; hind wing with a row of three black spots near the anal angle, surmounted by white circumflexes.

Hab. South Brazil.

THEOPE SYNGENES.

♀. 1″ 6‴. Allied to *Th. Lytæa,* Hübn. Costa of fore wing strongly arched near the base, incurved in the middle, and very slightly arched again before the apex, the latter distinctly produced; outer margin rounded outwards towards the hind angle. Above brown, a basal patch on fore wing and a spot near the costa towards the apex blue; hind wing with an irregular broad blue streak from the base to the outer border; the nervures are brown, and between them is a submarginal row of elongated triangular blackish spots.

Beneath rich tawny yellow, with a square rusty patch at apex of fore wing, and an obscure rusty-brown belt extending from it across the wings to the middle of the abdominal margin. The hind wing has a black spot surmounted by a white one near the anal angle, and a row of rusty-red spots in a line with it to the apex.

The subapical blue spot of fore wings is sometimes wanting.

Hab. Pará and Santarem, Amazons.

THEOPE DREPANA.

♂ & ♀. 1″. A small delicate species with strongly arched costa and falcate apex of fore wings—the falcation existing only in the ♂, the apex being simply acute in the ♀. The outer margin of the fore and hind wings is strongly bowed outwards, and in the hind wing is obtusely dentated and incurved towards the anal angle.

Above blue, with a broadish outer border and two very irregular flexuous lines of short lineoles across the disk blackish-brown; outer edge of wing and a submarginal row of specks (more distinct in the ♀) blackish. Fringe varied with lighter and darker brown.

Beneath pallid, minutely irrorated with rusty yellow, and varied with short, transverse, rusty-yellow lineoles, some of which unite beyond the middle to form a flexuous belt across both wings. Near the apex of the fore wing is a whitish patch, and there is a submarginal row of black specks surmounted by rusty-yellow circumflexes in both wings; a narrow edging of ferruginous to the outer borders.

Hab. Ega.

THEOPE DISCUS.

♂. 1″ 3‴. Fore-wing costa and outer border nearly straight, apex acute; outer border of hind wing rounded outwards; thorax oval, robust, antennæ more abruptly clubbed than in the typical species.

Above black, both wings with a basal spot occupying about one-third of the area of the wing glossy dark blue.

Beneath dark brown; basal part of costa of fore wing with a dark-brown streak (sometimes tinged with yellow); this is followed by a broad oblique basal belt of pale lilacine.

Hab. Pará and Upper Amazons.

The more abruptly formed antennal club, is not accompanied by any difference in palpi, neuration, or habits such as to warrant the separation of this species from the genus *Theope*. Like all the other species of *Theope* and *Aricoris*, the wings are held vertical in repose. It is closely allied to *Theope Janus* (Bates, Trans. Ent. Soc. vol. v. 3rd ser. p. 546).

THEOPE EURYGONINA.

♂. 1″ 4‴. Fore-wing costa very slightly arched near the base, incurved in the middle and more strongly arched before the apex, the latter subacute; outer margin nearly straight. Hind wing prolonged in its anal portion. Antennal club distinct, elongated.

Above, fore wing brown, with a triangular patch of light blue at the base. Hind wing glossy light blue, costal border brown.

Beneath light brown, wings crossed by three darker, rusty-brown belts and having a submarginal row of dark-brown specks (close to the third belt) encircled with light brown; a fine brown lineole crosses the end of the fore-wing cell.

♀. 1″ 4‴. Fore-wing costa similar in direction to that of the ♂, apex more obtuse, and outer margin bowed outwards. Hind wing not at all prolonged in its anal portion, outer margin subangularly bowed outwards. Above similar in colour to the ♂, but the hind wing has a submarginal row of large dusky triangular spots. Beneath, the same as in the ♂.

Hab. Santarem, Amazons.

THEOPE NOBILIS.

♂. 1″ 9‴. Fore wing triangular, costa very slightly arched near the base, then straight to near the apex, the latter acute, outer margin straight. Hind wing subtriangular, with advanced anal portion. Antennæ with distinct elongated club.

Above blackish brown; basal half of fore wing and whole of hind wing, except the broad costal border, fine dark blue; the blue of fore wing is bounded by the subcostal nervure, and its outer edge crosses the origin of the second median branch and extends to the outer margin of the wing.

Beneath yellow; hind wing with three or four black spots, surmounted by white circumflexes, near the anal angle.

♀. 1″ 9‴. Fore-wing costa strongly arched near the base, incurved in the middle, and scarcely at all arched again before the apex; outer margins of the hind wing rounded outwards and as much advanced as the anal angle. Above dark brown, fore wing with a basal patch and a twin spot beyond the end of the cell blue. Hind wing with the inner half blue, nervures dusky, and a submarginal row of thick longitudinal lineoles black.

Beneath rusty tawny; near the anal angle a row of four black spots surmounted by white lineoles, as in the ♂.

Hab. Pará, and R. Tapajos.

CATAGRAMMINA, nov. gen.

Wings large and broad in the ♂, similar in size, form, and colours to the genus *Catagramma*, Fam. Nymphalidæ; in the female resembling the genus *Aricoris*. Neuration as in the genera of the *Nymphidium* group, the second branch of the fore-wing subcostal nervure being emitted before the end of the cell. Palpi very slender, the apical joint projecting beyond the forehead in the ♂, the apical and part of the penultimate joint also visible from above in the ♀. Antennæ moderate, club distinct, gradually formed; shaft unicolorous in the ♂, sparingly spotted with pale colour beneath towards the base in the ♀. Head and palpi clothed with smooth compact scales. Fore legs in the ♂ densely clothed with silky hairs; second and third pairs of legs destitute of hairs, moderately elongated; tarsi without spines beneath in the ♂, spined in the ♀.

CATAGRAMMINA TAPAJA.

Necyria Tapaja, Saunders, Trans. Ent. Soc. v. 2nd ser. p. 108, pl. xi. f. 17, 18, ♂.

♀. Fore wing more elongated than in the ♂, outer margin rounded outwards. Above black or dark brown; basal half of fore wing carmine-red or orange-yellow, with a black patch, near the middle of the hind border, separated into two by the postmedian nervure, and sometimes extending to the base of the wing. In the black apical half of the wing there is a short belt of red or orange-yellow, its lower end connected with a submarginal row of white spots. Hind wing black or brown, with a submarginal row of white spots. Wing-lappets orange-yellow.

Beneath the same, but paler, and the hind wing having a patch of orange-yellow at the base.

Hab. Tapajos and Ega.

URANEIS, nov. gen.

Body robust. Fore wing elongate triangular, with the costa straight from the base to near the apex, where it arches downwards; apical angle distinct. Hind wing produced into a broad short lobe at the anal angle. Fore-wing subcostal nervure three-branched, emitting its first and second branches before the end of the cell, and its third much nearer to the apex than to the end of the cell. Discocellular nervules joining the median at its terminal fork, in both wings. Antennæ grey, long, three-fourths the length of the fore-wing costa; club gradually formed and of moderate thickness. Palpi projecting considerably beyond the forehead, but much longer in the ♀ than in the ♂, as in *Nymphidium*, *Aricoris*, &c., smoothly scaled, like the head, which is destitute of hairs or long hair scales. Wings semi-transparent, with black borders and nervures.

The wings in the ♀ are much more elongated than in the ♂. It is this character, together with the elongated palpi in the same sex, which induces me to separate the species on which the genus is founded from the genus *Tharops*, to which it is otherwise nearly allied.

The species, *U. hyalina*, Butler, is found only in the Amazons region, and has a very strong, rapid flight, settling on the under surface of leaves with the wings expanded.

Family ERYCINIDÆ.

Subfamily 1. NEMEOBIINÆ.

Four branches to the fore-wing subcostal nervure.

a. Old-World species.

Genus NEMEOBIUS.

Nemeobius, Steph. Ill. Br. Ent.; Westw. in D. W. & H. Gen. D. Lep. p. 419.

1. N. LUCINA, L. S. N. ii. 784, 203; Hübn. Schm. Eur. Pap. f. 20, 21.
Hab. Europe.

Genus DODONA.

Dodona, Hewits. Exot. Butt. (Jan. 1861).

1. D. DURGA, Kollar, Hügel's Reise, vol. iv. p. 441, t. 13. f. 3, 4.
Hab. Simla.

2. D. EGEON (Bdv.), D. W. & H. Gen. D. L. t. 69. f. 2.
Hab. Nepaul.

3. D. ADONIRA, Hewits. Exot. Butt. Dod. f. 1, 2, ♂.
Hab. Darjeeling.

4. D. DIPŒA, Hewits. Exot. Butt. Dod. f. 3, ♂.
Hab. Darjeeling.

5. D. OUIDA, Hewits. Exot. Butt. Dod. f. 4, 5, 6, ♂ ♀.
Hab. Darjeeling.

6. D. EUGENES, n. s., *suprà*, p. 371.
Hab. Bhotan, Nepaul.

Genus ZEMEROS.

Zemeros (Bdv.), Westw. in D. W. & H. Gen. D. L. p. 418.

1. Z. FLEGYAS, Cram. pl. 280. f. E, F (1782); D. W. & H. Gen. D. L. pl. 69. f. 5.
Z. Allica, Fab. E. S. iii. 1. 244–761 (1793).
Hab. Malacca, China, Java, Assam, India, Borneo.

2. Z. EMESIOIDES, Felder, Wien. ent. Monats. 1860, p. 396; Reise der Novara, Zool. ii. 2. p. 289, pl. xxxvi. f. 9, 10, 11, ♂ ♀.
Hab. Malacca, Sumatra Borneo.

Genus ABISARA.

Abisara, Feld. Wien. ent. Monats. Decem. 1860.
Sospita, Hewits. Exot. Butt. (Jan. 1861).

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1. A. FYLLA (Bdv.), D. W. & H. Gen. D. L. pl. 69. f. 3.
Hab. North India.

2. A. SEGECIA, Hewits. Exot. Butt. Sos. f. 4, 5, 6, ♂ ♀.
Hab. Aru, Mysol.

3. A. WALLACEI, Hewits. Exot. Butt. Sos. f. 7, 8, ♂.
Hab. Mysol.

4. A. STATIRA, Hewits. Exot. Butt. Sos. f. 9, 10, 11, 12, ♂ ♀; Hewits. Linn. Journal, Zool. viii. p. 148, var., ♀.
Hab. Mysol, Waigiou, Salwatty.

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5. A. ECHERIUS, Stoll, Suppl. Cram. pl. 31. f. 1. 1, A. B. (1791).
Coriolanus, Fab. E. S. iii. 1. 284. 91 (1793).
Hab. China, India, Philippines, Celebes.

6. A. KAUSAMBI, Feld. Wien. ent. Monats. Dec. 1860, p. 397.
Hab. Malacca.

7. A. LYDDA, Hewits. Exot. Butt. Sos. f. 13.
Hab. Hongkong.

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8. A. SUSA, Hewits. Exot. Butt. Sos. f. 2, ♂ (Jan. 1861).
A. Savitri, Feld. Wien. ent. Monats. Decem. 1860, p. 397, ♂ ♀.
Hab. Malacca, Sumatra, Singapore.

9. A. NEOPHRON (Bdv.), Hewits. Exot. Butt. Sos. f. 3.
Hab. Sylhet.

10. A. TEPAHI, Bdv. Lép. de Madagascar, pl. 3. f. 4.
Hab. Madagascar.

11. A. GERONTES, Fab. Sp. Ins. ii. 117 (1781).
Baucis, Drury, Ill. iii. pl. 12. f. 3, 4, App. (1783).
Hab. Sierra Leone.

12. A. TANTALUS (Bdv.), Hewits. Exot. Butt. f. 1, ♀; ib. f. 14, 15, ♂.
Hab. Ashanti, Old Calabar.

Genus TAXILA.

Taxila (Dbldy.), Westw. in D. W. & H. Gen. D. L. p. 421 (part.); Hewits. Exot. Butt. Jan. 1861.
Dicallaneura, Butler, Proc. Zool. Soc. 1867, p. 37 (part.).

1. T. THUISTO, Hewits. Exot. Butt. Tax. f. 5, 6.
Hab. Singapore, Sumatra.

2. T. PULCHRA, Guérin, Voy. Coquille, pl. 16. f. 2, 3, ♀.
Argynnis, id.
Emesis Leosida, Bdv. Voy. Astrolabe, Ins. i. p. 65.
Dicallaneura pulchra, Butler, Proc. Zool. Soc. 1867, p. 38.
Hab. Waigiou.

3. T. DECORATA, Hewits. Exot. Butt. Tax. f. 11, 12, 13, ♂ ♀.
Dicallaneura decorata, Butler, Proc. Zool. Soc. 1867, p. 38.
Hab. Aru Islands, New Guinea, Mysol.

4. T. DRUPADI, Horsfield, Cat. E. I. Co. pl. 2. f. 3, ♀ (1828).
Emesis Drupadi, Bdv. Sp. Gen. pl. 7. f. 2.
Hab. Java, Borneo, Malacca, Sumatra.

5. T. ORPHNA, Bdv. Sp. Gén. pl. 21. f. 4, ♂; Hewits. Exot. Butt. Tax. f. 7, ♂; Hewits. Linn. Journ. Zool. viii. p. 149, ♀.
Hab. Borneo, Sumatra, Singapore.

6. T. TANITA, Hewits. Exot. Butt. Taxila, text.
Orphna, D. W. & H. Gen. D. L. pl. 69. f. 6, 7. ? two species (nec Bdv.).
Hab. Borneo, India.

7. T. DAMAJANTI, Feld. Wien. ent. Monats. Dec. 1860, n. 13.
Hab. Malacca.

8. T. TELESIA, Hewits. Exot. Butt. Tax. f. 1, 2, ♂; Linn. Journal, Zool. viii. p. 149, ♀.
Hab. Sarawak, Sumatra.

9. T. TENETA, Hewits. Exot. Butt. Tax. f. 3, 4.
Hab. Sarawak.

b. *New-World species.*

Genus ALESA.

Alesa (Dbld.), Westw. in D. W. & H. Gen. D. L. p. 417.

1. A. PREMA, Godt. Enc. Méth. ix. 569. 27; D. W. & H. Gen. D. L. pl. 70. f. 8, ♂.
Smaragdifera, Westw. in D. W. & H. p. 418, ♀.
Hab. Brazil, Amazons.

2. A. TELEPHAE, Bdv. Sp. Gén. pl. 20. f. 2, ♂.

Eurybia Telephae, Westw. in D. W. & H. p. 417.
♀, *suprà*, p. 372.
Hab. Cayenne, Amazons.

3. A. Amesis, Cram. pl. 104. f. F, ♀.
Priolas, Godt. Enc. M. ix. 569. 26, ♂.
Amesis, H.-Schäff. Exot. Schm. f. 45, 46, ♂.
Hab. Cayenne, Amazons.

4. A. lipara, n. s., *suprà*, p. 371.
Hab. Tapajos, Amazons.

5. A. Thelydrias, n. s., *suprà*, p. 371.
Hab. River Cupari, Amazons.

6. A. hemiurga, n. s., *suprà*, p. 372.
Hab. Upper Amazons.

Genus Eurybia.

(Illiger) Hübn. Verz. p. 17; Godt. Enc. M. p. 458.

1. Eu. Carolina, Godt. Enc. M. 459. 1; Guér. Icon. R. A. Ins. pl. 80. f. 4; Voy. Coquille, Zool. p. 282, Ins. pl. 14 bis. f. 2.
Hab. South Brazil.

2. Eu. Pergæa, Hübn. Zutr. f. 747, 748.
Emesis Pergæa, Westw. in D. W. & H. p. 447.
Hab. South Brazil.

3. Eu. Salome, Cram. pl. 12. f. G, H (1775).
Nicæus, Fab. Syst. Ent. p. 482. n. 175 (1775), descr. very imperfect.
Var. *Dardus*, Fab. E. S. iii. 1. p. 482. n. 156 (1793).
Hab. Guiana, Amazons.

4. Eu. donna, Feld. Wien. ent. Monats. 1862, p. 410; Reise d. Novara, p. 288, pl. xxxv. f. 5, 6.
Hab. Bogotá.

5. Eu. Upis, Hübn. Samml. ex. Schm. ii.
Local var. *Eu. Franciscana* (Bates), Feld. W. ent. M. 1862, p. 70.
Hab. Brazil, Amazons.

6. Eu. Lamia, Cram. pl. 150. f. C, ♂.
Hab. Surinam.

7. Eu. Lycisca, D. W. & H. Gen. D. L. pl. 69. f. 4.
? Local var. *Eu. Lamia*.
Hab. Honduras.

8. Eu. Halimede, Hübn. Samml. ex. Schm. i.
Hab. Bahia, Amazons.

9. Eu. Juturna, Felder, Reise der Novara, Zool. ii. 2. p. 288.
Hab. Surinam, Amazons.

Genus EUNOGYRA.

Westw. D. W. & H. Gen. D. L. p. 463.

1. EU. SATYRUS, D. W. & H. Gen. D. L. pl. 72. f. 11.
Hab. Upper Amazons.

2. EU. CURUPIRA, Bates.
Satyrus, H.-Schäff. Exot. Schm. f. 41 (nec Westw.).
Hab. Lower Amazons.

Genus MESOSEMIA.

Mesosemia, Hübn. Verz. bek. Schm. p. 21 (1816); Westw. in D. W. & H. Gen. D. L. p. 453.
Diophthalma, Blanchard, Anim. Art. iii. p. 466 (1840).

1. M. STELI (Bdv.), Hewits. Exot. Butt. Mes. f. 13, ♀.
Hab. Amazons.

2. M. NESTI (Bdv.), Hewits. Exot. Butt. Mes. f. 11, 12, ♂.
Hab. Cayenne.

3. M. EUMENE, Cram. pl. 92. f. F, G (1779), ♂.
Eumenus, Fab. Sp. Ins. ii. p. 307. n. 68 (1781).
Eumenus, Hewits. Exot. Butt. Mes. f. 38, ♀.
Hab. Surinam, Amazons.

4. M. ULRICA, Cram. pl. 100. f. E, F (1779), ♂.
Ulricus, Fab. Mant. Ins. ii. 735. 82 (1787).
Hab. Surinam, Amazons.

5. M. TITEA, Stoll, Suppl. Cram. pl. 5. f. 6, ♂.
♀ ? *Rosina*, Cram. pl. 326. f. B (1782).
♀ ? *Renatus*, F. Mant. ii. 330. 31 (1787).
Hab. Surinam.

6. M. MACELLA, Hewits. Exot. Butt. Mes. f. 28, 29, 30, ♂ ♀.
Hab. Amazons.

7. M. ODICE, Godt. Enc. M. 583. 88; Hewits. Exot. Butt. Mes. f. 14.
Hab. S. Brazil.

8. M. RHODIA, Godt. Enc. M. 583. 89; Hewits. Exot. Butt. Mes. f. 15.
Hab. S. Brazil.

9. M. MÆSIA, Hewits. Exot. Butt. Mes. f. 7. 8.
Hab. S. Brazil.

10. M. TELEGONE, Bdv. Sp. Gén. pl. 21. f. 2, ♂; Hewits. Exot. Butt. Mes. f. 9, 10, var.?
Hab. New Granada, S^{ta} Martha.

11. M. LAMACHUS, Hewits. Exot. Butt. Mes. f. 3, 4, 5, 6.
Hab. Honduras, Guatemala.

12. M. AMIANA, Feld. Wien. ent. Monats. 1861, p. 100.
Hab. Caraccas.

13. M. GAUDIOLUM, Bates, Entom. Monthly Mag. i. p. 202.
Hab. Guatemala.

14. M. CARISSIMA, Bates, Entom. Monthly Mag. iii. 1866, p. 153.
Hab. Veragua.

15. M. MESSEIS, Hew. Exot. Butt. Mes. f. 75, ♂.
Hab. Amazons.

16. M. MELETIA, Felder, Reise der Novara, Zool. ii. 2. p. 297 (*Diophthalma Meletia*).
Hab. Bogotá.

17. M. MEVANIA, Hew. Exot. Butt. Mes. f. 1, 2.
Hab. New Granada.

18. M. MACRINA.
Diophthalma Macrina, Felder, Reise der Novara, Zool. ii. 2. p. 296.
Hab. Bogotá.

19. M. METUANA.
Diophthalma Metuana, Felder, Reise der Novara, Zool. ii. 2. p. 297.
Hab. Bogotá.

20. M. MÆNADES, Hew. Exot. Butt. Mes. f. 18.
Hab. New Granada.

21. M. PHELINA, Felder, Wien. entom. Monats. 1862, p. 411; Reise der Novara, Zool. ii. 2. p. 298, t. xxxviii. f. 9, 10, ♂.
Hab. Bogotá.

22. M. MEEDA, Hew. Exot. Butt. Mes. f. 16, 17.
Hab. Brazil.

23. M. EPIDIUS (Bdv.), Hew. Exot. Butt. Mes. 45, 46, 47, ♂ ♀.
Hab. Cayenne.

24. M. ANTÆRICE, Hewits. Exot. Butt. Mes. f. 52, 53.
Hab. Amazons.

25. M. CALYPSO, n. s., *suprà*, p. 374.
Hab. Upper Amazons.

26. M. CIPPUS (Bdv.), Hew. Exot. Butt. Mes. f. 48, 49, ♂.
Mœotis, Hew. Exot. Butt. Mes. f. 50, 51, ♀.
Hab. Amazons.

27. M. SYLVINA, n. s., *suprà*, p. 372.
Hab. Lower Amazons.

28. M. MENŒTES, Hew. Exot. Butt. Mes. f. 56, 57, 58, ♂ ♀.
Hab. Upper Amazons.

29. M. PHILOCLES, L. S. N. ii. 791. 240; Clerck, Icones, t. 45. f. 5, 6; Cram. pl. 184. f. D, E (not F), ♂.
Hab. Lower Amazons, Surinam.

Var. *M. Egabella*, Bates, *suprà*, p. 374; Hew. Exot. Mes. f. 62, 63 ♂, f. 61 ♀.
Hab. Upper Amazons.

Var. *M. lætifica*, Bates, *suprà*, p. 373.
Hab. Pará.

30. M. MYONIA, Hew. Exot. Butt. Mes. f. 59, 60, ♀.
? Var. *Philocles* ♀.
Hab. Amazons.

31. M. MACHÆRA, Hew. Exot. Butt. Mes. f. 70, 71, ♂.
Hab. Amazons.

32. M. MAGETE, Hew. Exot. Butt. Mes. f. 72.
Hab. Amazons.

33. M. METOPE, Hew. Exot. Butt. Mes. f. 64, 65, ♂.
Hab. Amazons.

34. M. OLIVENCIA, Bates, *suprà* p. 373.
Hab. Upper Amazons.

35. M. THYMETUS, Cram. pl. 184. f. G.
Var. ? *Osinia*, Cram. pl. 115. f. F.
Hab. Surinam, Amazons.

36. M. SIFIA, Bdv. Sp. Gén. pl. 6. f. 9.
Hab. Brazil.

37. M. MELÆNÆ, Hew. Exot. Butt. Mes. f. 54, 55, ♂.
Hab. Amazons.

38. M. METHION, Hew. Exot. Butt. Mes. f. 76.
Hab. Brazil.

39. M. MINOS, Hew. Exot. Butt. Mes. f. 39, 40, 41, ♂ ♀.
Hab. Amazons.

40. M. TRAGA, Hew. Exot. Butt. Mes. f. 42, 43, 44, ♂ ♀.
Philocles ♀, Cramer, pl. 184. f. F.
Hab. Surinam, Amazons.

41. M. MOSERA, Hew. Exot. Butt. Mes. f. 77, 78, 79, ♂ ♀.
Hab. Amazons.

42. M. MELESE, Hew. Exot. Butt. Mes. f. 74.
Hab. Amazons.

43. M. IBYCUS, Hew. Exot. Butt. Mes. f. 68, 69, ♂ ♀.
Hab. Amazons.

44. M. MELPIA, Hew. Exot. Butt. Mes. f. 66, 67, ♂ ♀.
Hab. Amazons.

45. M. FORMOSA (Hewits.), Westw. in D. W. & H. Gen. D. L. p. 454, pl. 71. f. 5 (not 6).
Hab. Amazons.

46. M. MISIPSA, Hew. Exot. Butt. Mes. f. 33, 34, 35, ♂ ♀.
? *Ephyne*, Cram. pl. 93. f. E, F (1779).
? *Ephynes*, F. Sp. Ins. ii. 338. 68 (1781).
Hab. Amazons.

47. M. IDOTEA, Westw. in D. W. & H. Gen. D. L. p. 455, ♀ (1851). Hewits. Exot. Butt. Mes. f. 36, 37, ♂ ♀.
Mirita, H.-Schäff. Exot. Schm. p. 55, f. 42, ♂ (1853).
Hab. Amazons.

48. M. PHILEMON, Cram. pl. 22. f. G, H (1775).
Icarus, Fab. Mant. ii. 705. 77 (1787).
Hab. Guiana, Amazons.

49. M. LAGORA, H.-Schäff. Exot. Schm. p. 55, f. 43, 44; Hewits. Exot. Butt. Mes. f. 20, var. ?
Hab. New Granada.

50. M. VESTALIS, Bates, Entom. Monthly Mag. i. p. 203.
Hab. Guatemala.

51. M. HYPHÆA, Cram. pl. 92. f. C (1779).
Hyphæus, Fab. Sp. Ins. ii. 305. 67 (1781).
Hab. Surinam, Amazons.

52. M. MATISCA, Hew. Exot. Butt. Mes. f. 73.
Hab. Amazons.

53. M. MACARIS, Hewits. Exot. Butt. Mes. f. 31, 32, ♂ ♀.
Hab. Amazons.

54. M. GEMINUS, Fab. Ent. Syst. iii. 1. 322. 220; Hewits. Exot. Butt. Mes. f. 21, 22, ♂ ♀.
Cœlestina, Ménétr. Cat. Mus. St. Petersb. pl. 6. f. 7.
Hab. S. Brazil.

55. M. CRŒSUS, Fab. Gen. Ins. Mant. 259 (1776), ♂; Hewits. Exot. Butt. Mes. f. 25, 26, ♀.
Capanæus, Cram. pl. 236. f. D (1782), ♂.
Tullius, Fab. E. S. iii. 1. 704. 224, ♀.
Var., ♀, *Meana*, Hewits. Exot. Butt. Mes. f. 23, 24.
? Var., ♀, *Gneris* (Bdv.), D. W. & H. Gen. D. L. pl. 71. f. 6.
Hab. Surinam, Cayenne, Amazons.

56. M. MARISA, Hewits. Exot. Butt. Mes. f. 27, ♀.
Hab. Amazons.

57. M. TENERA (Bdv.), Westw. in D. W. & H. Gen. D. L. p. 455; Hewits. Exot. Butt. Mes. f. 19.
Hab. Venezuela, Amazons.

58. M. MARTHA, Prittwitz, Stettin. ent. Zeit. 1865, p. 315.
Hab. Rio Janeiro.

Genus CREMNA.

Cremna (Dbldy.), Westw. D. W. & H. Gen. D. L. p. 456.

1. C. CENEUS, Cram. pl. 156. f. F (fig. bad); Westw. G. D. L. p. 456, desc.
Hab. Guiana, Amazons.

2. C. HETEROEA, Bates, Tr. Ent. Soc. v. 3rd ser. p. 542.
Hab. Upper Amazons.

3. C. BELTIANA, Bates, Tr. Ent. Soc. v. 3rd ser. p. 541.
Hab. Montes Aureos, Maranham.

4. C. ACTORIS, Cram. pl. 93. f. D, ♂ (bad figure ?).
Hab. Surinam.

5. C. EUCHARILA, Bates.
Actoris, Hübn. Exot. Schm. i. (nec Cram.).
Hab. Amazons, Bahia.

6. C. PHRYXE, Felder, Reise der Novara, Zool. ii. 2. p. 299, t. xxxvii. f. 23, 24, ♀.
Hab. Bahia.

7. C. MELAMPIA, Bates, Tr. Ent. Soc. v. 3rd ser. p. 543.
Hab. Bahia.

Genus HYPHILARIA.

Hyphilaria, Hübn. Verz. p. 26.
Bœotis, Westw. D. W. & H. Gen. D. L. p. 451. § 1.

1. H. ANOPHTHALMA.
Diophthalma anophthalma, Felder, Reise der Novara, Zool. ii. 2. p. 298, t. xxxviii. f. 7, 8.
Hab. Bogotá.

2. H. NICIAS, Stoll, Suppl. Cram. pl. 13. f. 3.
Nicon, Godt. Encyc. Méth. 588. 19.
Hab. Surinam, Amazons.

3. H. PARTHENIS (Dbld.), D. W. & H. Gen. D. L. pl. 71. f. 1, ♂.
Cydias, Westw. Gen. D. L. p. 451, ♀.
Hab. Amazons.

Subfamily 2. EURYGONINÆ.

Branches of the fore-wing subcostal nervure variable in number. Lower radial nervure emitted straight from the subcostal, or connected with it by an oblique perfect discocellular nervule.

Genus EURYGONA.

Eurygona (Boisduval), Westwood in D. W. & H. Gen. D. L. p. 437.

1. EU. ZARA (Hewits.), D. W. & H. Gen. D. L. p. 438, pl. 71. f. 7, ♂; Hewits. Exot. Butt. Eur. f. 72, 73, ♀.
Hab. Brazil.

2. Eu. Uzita, Hewits. Exot. Butt. Eur. f. 12, 13, ♂.
Hab. Amazons.

3. Eu. eucritus, Hewits. Exot. Butt. Eur. f. 14, 15 ♂, 16 ♀.
Hab. Amazons.

4. Eu. Zena, Hewits. Exot. Butt. Eur. f. 74 & 76, ♂.
Hab. Amazons.

5. Eu. coccinella, n. s., *suprà*, p. 374 ♂.
Zena ♀, Hewits. Exot. Butt. Eur. f. 75, ♀.
Hab. Amazons.

6. Eu. Eutæa, Hewits. Exot. Butt. Eur. f. 8, 9, ♀.
Hab. Amazons.

7. Eu. Gelon, Stoll, Suppl. Cram. pl. 5. f. 2, 2 b, ♀ ?
Hab. Surinam.

8. Eu. Sabinus, Stoll, Suppl. Cram. pl. 9. f. 3, 3 a, ♂.
Hab. Surinam.

9. Eu. Erythræa, n. s., *suprà*, p. 375.
Hab. Amazons.

10. Eu. Euritæus, Cram. pl. 152. f. D, E, ♂; Hewits. Exot. Butt. Eur. f. 10, 11, ♀.
Hab. Guiana, Amazons.

11. Eu. Charilis, n. s., *suprà*, p. 375.
Hab. Upper Amazons.

12. Eu. calligramma, n. s., *suprà*, p. 375.
Hab. Upper Amazons.

13. Eu. Eutychus, Hewits. Exot. Butt. Eur. f. 44, 45, 46, ♂ ♀.
Orfita, Cram. (part.), pl. 112. f. D, E.
Hab. Surinam, Amazons.

14. Eu. clithra, n. s., *suprà*, p. 377.
Hab. Pará, Maranham.

15. Eu. ferrugo, n. s., *suprà*, p. 376.
Hab. Ega, Amazons.

16. Eu. Phœdica, Bdv. Sp. Gén. pl. 21. f. 3, ♂; Hewits. Exot Butt Eur. f. 47, 48, 49, ♂ ♀.
Hab. Cayenne, Amazons.

17. Eu. Orfita, Cram. pl. 112. f. F ♂; Hewits. Exot. Butt. Eur. f. 50, 51, ♂ ♀.
Hab. Surinam, Amazons.

18. Eu. Euodias, Hewits. Exot. Butt. Eur. f. 42, 43, ♂.
Hab. Amazons.

19. Eu. Euryone, Hewits. Exot. Butt. Eur. f. 53, 54.
Hab. Amazons.

20. Eu. Melaphæa, Hübn. Zutr. f. 209, 210.
Hab. Amazons.

21. Eu. Eulione, Hewits. Exot. Butt. Eur. f. 52.
Hab. Amazons.

22. Eu. Hygenius, Stoll, Suppl. Cram. pl. 9. f. 2, 2 B, ♂.
Hab. Surinam, Amazons.

23. Eu. Cafusa, Bates.
Mys, Hewits. (part.) Exot. Butt. Eur. f. 57, .
Hab. Amazons.

24. Eu. Mys, H.-Schäff. Exot. Schm. f. 37, 38; Hewits. Exot. Butt. Eur. f. 55, 56, 58, 59, 60, 61, ♂ ♀.
Hab. Amazons.

25. Eu. Crotopus, Cram. pl. 336. f. E, F, ♂ (1782); ♀, Hewits. Exot. Butt. Eur. f. 36 (as *Midas*, F.).
♀ ? *Midas*, Fabr. Mant. ii. 718. 79 (1787).
Var., ♂, Hewits. Exot. Butt. Eur. f. 37 (as *Midas*, F.).
Hab. Guiana, Amazons.

26. Eu. extensa, n. s., *suprà*, p. 377.
Hab. Upper Amazons.

27. Eu. eubotes, Hewits. Exot. Butt. Eur. f. 64.
Hab. Amazons.

28. Eu. Uria, Hewits. Exot. Butt. Eur. f. 22, ♂.
Hab. Amazons.

29. Eu. Lisias, Cram. pl. 152. f. F, G, ♂.
Salimba, Godt. Enc. Méth. 568. 17.
Hab. Surinam, Amazons.

30. Eu. Euromus, Hewits. Exot. Butt. Eur. f. 70, 71, ♂.
Hab. Amazons.

31. Eu. Euhemerus, Hewits. Exot. Butt. Eur. f. 65, 66, ♀.
? ♀ *Euromus*.
Hab. Amazons.

32. Eu. Dorina, Hewits. Exot. Butt. Eur. f. 80, 81.
Hab. Amazons.

33. Eu. Eubages, Hewits. Exot. Butt. Eur. f. 68, 69, ♀.
Hab. Amazons.

34. Eu. Euoras, Hewits. Exot. Butt. Eur. f. 38, 39, 40, ♂ ♀.
Hab. Amazons.

35. Eu. violetta, n. s., *suprà*, p. 378.
Hab. Tapajos, Amazons.

36. Eu. Arbas, Cram. pl. 379. f. L, M, ♂; Hew. Exot. Butt. Eur. f. 41, ♀.
Hab. Surinam, Amazons.

37. Eu. Anica, H.-Schäff. Exot. Schm. f. 31, 32, ♀ (probably ♀ *Arbas*).
Hab. Surinam.

38. Eu. modesta, n. s., *suprà*, p. 376.
Hab. Tapajos, Amazons.

39. Eu. Eunæus, Hewits. Exot. Butt. Eur. f. 4, 35, ♂.
Hab. Amazons.

40. Eu. Gelanor, Cram. pl. 336. f. C, D, ♂; Hewits. Exot. Butt. Eur. f. 20, 21.
Hab. Surinam, Amazons.

41. Eu. Eumenes, Hewits. Exot. Butt. Eur. f. 18, ♂.
Hab. Amazons.

42. Eu. Eusepus, Hewits. Exot. Butt. Eur. f. 17, ♂.
Hab. S. Brazil.

43. Eu. Urites, Hewits. Exot. Butt. Eur. f. 19, ♂.
Hab. Amazons.

44. Eu. Chrysippe, Bates, Entom. Monthly Mag. iii. p. 154.
Hab. Veragua.

45. Eu. Labdacus, Cram. pl. 336. f. G, H, ♂.
Hab. Surinam.

46. Eu. Utica, Hewits. Exot. Butt. Eur. f. 29, 30, 31.
Hab. Brazil.

47. Eu. Teleclus, Stoll, Suppl. Cram. pl. 5. f. 4, 4 e (1791).
Gemellus, Fab. E. S. iii. 1. 319. 208 (1793)?
Catoleuce, Hübn. Zutr. f. 207, 208 (1823).
Hab. Guiana, Amazons.

48. Eu. Gyda, Hewits. Exot. Butt. Eur. f. 79, ♂.
Hab. Brazil.

49. Eu. Euphaes, Hewits. Exot. Butt. Eur. f. 27, 28, ♂.
Hab. Amazons.

50. Eu. opalina, Westw. in D. W. & H. Gen. D. L. p. 438, ♂; Hewits. Exot. Butt. Eur. f. 25, 26, ♂.
Hab. Amazons.

51. Eu. opalescens, Hewits. Exot. Butt. Eur. f. 23, 24.
Hab. S. Brazil.

52. Eu. Mazaca, Hewits. Exot. Butt. Eur. f. 77, 78, ♂.
Hab. Amazons.

53. Eu. Artos, H.-Schäff. Exot. Schm. f. 35, 36, ♂.
Hab. Amazons.

54. Eu. Eumedia, Hewits. Exot. Butt. Eur. f. 6, 7, ♂.
Ophias, H.-Schäff. Exot. Schm. f. 33, 34, ♂.
Hab. Amazons.

55. Eu. Pelor (Dbldy.), Hewits. Exot. Butt. Eur. f. 1, 2, 3, ♂ ♀.
Hab. Amazons.

56. Eu. Eubœa, Hewits. Exot. Butt. Eur. f. 4, 5, ♂.
Hab. Amazons.

57. Eu. Mirania, n. s., *suprà*, p. 376.
Hab. Upper Amazons.

58. Eu. angulata, n. s., *suprà*, p. 376.
Hab. Upper Amazons.

59. Eu. Eurypus, Hewits. Exot. Butt. Eur. f. 63.
Hab. Amazons.

60. Eu. Clesa (Bdv.), Hewits. Exot. Butt. Eur. f. 67.
Hab. Brazil.

61. Eu. Euplœa, Hewits. Exot. Butt. Eur. f. 32, 33.
Hab. S. Brazil.

62. Eu. Eugæon, Hewits. Exot. Butt. Eur. f. 62.
Hab. Amazons.

63. Eu. Thucydides, Fab. E. S. iii. 1. 323. 225 (1793); Don. Ins. Ind. pl. 43. f. 1.
Nycha, Hübn. Zutr. f. 279, 280 (1823).
Arisbas, Dalm. Anal. Entom. p. 43 (1823).
Hab. Brazil.

64. Eu. Apisaon, Dalm. Anal. Entom. p. 43.
Hab. Brazil.

Genus Methonella.

Methonella, Westwood, in D. W. & H. Gen. D. L. p. 533.

1. M. Cecilia, Cramer, pl. 159. f. D, E, ♀.
Cicilia, Cramer, pl. 376. f. G, H, ♂.
Hab. Surinam, Amazons.

Subfamily 3. Erycininæ.

Three branches to the fore-wing subcostal nervure*. Lower radial of both wings connected with the subcostal, at a right angle, by a discocellular nervule more or less rudimentary.

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* Except in the genus *Isapis*, which offers a curious aberration in its neuration; it has only two fore-wing subcostal branches—one emitted at the end of the cell, and the other at a distance beyond it.

A. *Antennæ dark-coloured, without white rings or spots. Fore-wing subcostal nervure, in the majority of genera, emitting its second branch after the end of the cell.*

Genus THEMONE.

Themone, Westw. in D. W. & H. Gen. D. L. p. 461.

1. TH. PAIS, Hübn. Samml. exot. Schm. ii.; Zutr. f. 749, 750; D. W. & H. Gen. D. L. pl. 72. f. 9.
? *Halius*, Dalman, Anal. Ent. p. 45. n. 16.
Hab. Brazil, Amazons.

2. TH. PŒCILA, n. s., *suprà*, p. 378.
Hab. Upper Amazons.

3. TH. (?) PULCHERRIMA, Herrich-Schäff. Exot. Schm. pp. 55 & 77, f. 26, 27.
Hab. Surinam.

Genus NOTHEME.

Notheme, Westw. in D. W. & H. Gen. D. L. p. 462.

1. N. OURANUS, Cram. pl. 335. f. C (fig. bad); Fab. E. S. iii. 1. 317. 200.
♀ *Amblygonia agathon*, Felder, Reise der Novara, Zool. ii. 2. p. 308, t. xxxvii. f. 25, 26.
Hab. Surinam, Amazons, Bahia.

2. N. (?) AMARYNTHINA. *Amblygonia amarynthina* Felder, Reise der Novara, Zool. ii. 2. p. 309.
Hab. New Granada.

Genus PANARA.

Panara, Westw. in D. W. & H. Gen. D. L. p. 442.

1. P. IARBAS, Drury, Ill. iii. pl. 8. f. 2 ♀ (1783). *P. Perditus*, Fab. E. S. iii. 1. 323. 222 (1793); Hübn. Samml. ex. Schm. ii.
Hab. S. Brazil.

2. P. PHERECLUS, Linn. S. N. 792, 248; Clerck, Icones, t. 45. f. 4 ♂ (1759); Cramer, pl. 178. f. D (fig. bad) ?.
P. Barsacus, D. W. & H. Gen. D. L. pl. 72. f. 10 ♂.
Hab. Surinam, Amazons.

Genus LYMNAS.

Lymnas (Bdv.), Blanch. Anim. Artic. iii. p. 464 (1840).
Limnas, Westw. in D. W. & H. Gen. D. L. p. 459 (1851).

1. L. SMITHIÆ (Bdv.), D. W. & H. Gen. D. L. pl. 73. f. 8.
Hab. Brazil.

2. L. Zoega, Hewits. Exot. Butt. Lim. f. 2.
Hab. Minas Geraes, Amazons.

3. L. flammula, n. s., *suprà*, p. 380.
Hab. Upper Amazons.

4. L. Unxia, Hewits. Exot. Butt. Lim. f. 3; Ménétr. Cat. St. Petersb. t. iv. f. 2, p. 94, slight var.
Hab. S. Brazil.

5. L. Xarifa, Hewits. Exot. Butt. Lim. f. 1.
Hab. Venezuela.

6. L. Volusia, Hewits. Exot. Butt. Lim. f. 4.
Hab. Rio Janeiro.

7. L. Pixe, Bdv. Sp. Gén. pl. 20. f. 1.
Hab. Mexico.

8. L. Melantho, Ménétr. Cat. St. Petersb. t. iii. f. 7, p. 93.
Hab. Nicaragua.

9. L. electron, Fab. E. S. iii. 1. 321. 214.
Hab. Cayenne.

10. L. Melander, Cram. pl. 336. f. A.
Electron, Godt. Enc. Méth. 590. 130?; var. ? Cram. pl. 336. f. B; var. ? Ménétriés, Cat. St. Petersb. t. iv. f. 1.
Hab. Surinam, Amazons.

11. L. Ubia, Felder, Reise der Novara, Zool. ii. 2. p. 303; ? var. *Melander*.
Hab. Cayenne, Obydos, Lower Amazons.

12. L. Lycea, Hübn. Zutr. f. 283, 284.
Hab. Bahia.

13. L. Xenia (Bdv.), Hewits. Exot. Butt. Lim. f. 11.
Hab. Minas Geraes.

14. L. Barca (Bdv.), Hewits. Exot. Butt. Lim. f. 12.
Hab. Brazil.

15. L. Erythrus, Ménétr. Cat. St. Petersb. t. iii. f. 8, p. 93.
Hab. Brazil.

16. L. Agria (Bdv.), Hewits. Exot. Butt. Lim. f. 10.
Hab. Brazil.

17. L. Lycisca, Hewits. Exot. Butt. Lim. f. 7, 8, 9.
Hab. Minas Geraes.

18. L. Inaria, D. W. & H. Gen. D. L. pl. 73. f. 7.
Hab. Amazons.

19. L. Thyatira, Hewits. Exot. Butt. f. 6.
Hab. Amazons.

20. L. CEPHISE.

Lyropteryx Cephise, Ménétr. Cat. St. Petersb. p. 89, pl. iii. f. 3.

Hab. Nicaragua.

21. L. SEMIOTA, n. s., *suprà*, p. 380.

Hab. Tapajos, Amazons.

Genus DRYAS.

Dryas, Felder, Reise der Novara, Zool. ii. 2. p. 305.

1. D. CINARON, Felder, Reise der Novara, Zool. ii. 2. 305, t. xxxviii. f. 13, 14.

Limnas Cinaron, Felder, Wien. ent. Monats. 1861, p. 101.

Hab. Bogotà.

Genus XENANDRA.

Xenandra, Felder, Reise der Novara, Zool. ii. 2. p. 304.

1. X. HELIUS, Cram. pl. 198. f. B ♂.

♀ ? *Phereclus*, Cram. pl. 178. f. D (nec Clerck).

Hab. Surinam.

2. X. HELIOIDES, Felder, *l. c.* p. 304, t. xxxviii. f. 19, 20, 21, 22 ♀ ♂.

Hab. Bahia, Amazons.

Genus LYROPTERYX.

Lyropteryx, Westw. Gen. D. L. p. 433.

1. L. APOLLONIA, Westw. in D. W. & H. Gen. D. L. p. 433, pl. 72. f. 1 ♂.

L. Apollonia ♀, Saunders, Trans. Ent. Soc. 2nd ser. v. p. 109, pl. xi. f. 19.

Hab. Amazons.

2. L. LYRA, Saund. Trans. Ent. Soc. 2nd ser. v. p. 109.

Hab. New Granada.

3. L. TERPSICHORE, Westw. in D. W. & H. Gen. D. L. p. 433; Ménétr. Cat. Lep. Mus. St. Petersb. t. iii. f. 2.

Hab. Minas Geraes, R. Tapajos.

Genus CYRENIA.

Cyrenia, Westw. in D. W. & H. Gen. D. L. p. 434.

1. C. MARTIA, Westw. in D. W. & H. Gen. D. L. p. 434, pl. 72. f. 2.

Hab. Amazons.

2. C. (?) BELPHEGOR, Westw. in D. W. & H. Gen. D. L. p. 430, pl. 70. f. 1.

Hab. Amazons.

Genus HADES.

Hades, Westw. in D. W. & H. Gen. D. L. p. 435.

Moritzia, Felder, Wien. ent. Monats. 1861, p. 100.

1. H. NOCTULA, Westw. in D. W. & H. Gen. D. L. p. 434, pl. 72. f. 3.

M. paradoxa, Felder, Wien. ent. Monats. 1861, p. 100.

Hab. Venezuela.

Genus Necyria.

Necyria, Westw. in D. W. & H. Gen. D. L. p. 432.

1. N. Bellona, Westw. in D. W. & H. Gen. D. L. p. 432, pl. 73. f. 9.
Hab. West Brazil.

2. N. Duellona, Westw. in D. W. & H. Gen. D. L. p. 432.
Hab. Ecuador.

3. N. Manco, Saund. Trans. Ent. Soc. 2nd ser. v. p. 107, pl. xi. f. 16= *N. fulminatrix*, Feld. Wien. ent. Monats. 1861, p. 101; Reise der Novara, Zool. ii. 2. p. 291, t. xxxvi. f. 1, 2.
Hab. Bogotá, New Granada.

4. N. Saundersii, Hewits. Trans. Ent. Soc. 2nd Ser. ii. pl. 22. f. 1.
Hab. New Granada.

5. N. Hewitsonii, Saund. Trans. Ent. Soc. 2nd Ser. v. p. 107, pl. x. f. 9, 10.
Hab. New Granada.

6. N. Lindigii, Feld. Wien. ent. Monats. 1862, p. 411; Reise der Novara, Zool. ii. 2. p. 291, t. xxxvi. f. 3, 4.
Hab. Bogotá.

Genus Erycina.

Erycina (Fabr. Syst. Gloss.), Westw. Gen. D. L. p. 428.

1. E. Melibœus, Fab. Gen. Ins. Mant. p. 271 (1776), ♂; Westw. in D. W. & H. Gen. D. L. p. 430, ♂ ♀.
Pyretus, Cram. pl. 144. f. A, B (1779), ♂.
Julia, Saund. Trans. Ent. Soc. v. pl. 21. f. 1, 1*a*, ♂, f. 2, 2*a*, ♀.
Hab. Surinam, Amazons.

2. E. miniola, n. s., *suprà*, p. 384.
Hab. Upper Amazons.

3. E. Aulestes, Cramer, pl. 128. f. G (1779), ♀.
Melibœus, Boisd. Sp. Gén. pl. 6. f. 12, ♂; Morisse, Ann. Soc. Ent. Fr. vi. p. 426, ♂.
Pyretus, Saunders, Tr. Ent. Soc. v. pl. 21. f. 4, 4*a*, ♂.
Glaphyra, Saunders, Tr. Ent. Soc. p. 222, pl. 21. f. 3, ♀.
Julia, Westw. D. W. & H. Gen. D. L. p. 430, ♂ (1851).
Hab. Surinam, Amazons.

4. E. Tedea, Cram. pl. 102. f. A ♀; Saund. Tr. E. S. v. 223, pl. 23. f. 2, 2*a*, ♀.
Hab. Surinam, Amazons.

5. E. colubra, Saund. Tr. E. S. 2nd Ser. v. p. 103, pl. 11. f. 12, ♂.
Hab. Amazons.

6. E. Etias, Saund. Tr. E. S. 2nd Ser. v. p. 102, pl. 11. f. 11, ♂.
Hab. Peru.

7. E. Eryxo, Saund. Tr. E. S. 2nd. Ser. v. p. 104, pl. 11. f. 13, ♀: probably ♀ of *E. Etias*.
Hab. Peru.

8. E. Montezuma, Saund. Tr. E. S. v. p. 226, pl. 21. f. 5, ♂.
Jurgensenii, Saund. *l. c.* p. 220, pl. 20. f. 3, ♀.
Hab. Mexico.

9. E. Callias, Feld. Wien. ent. Monats. 1862, p. 71.
Hab. Upper Rio Negro.

10. E. Huascar, Saund. Tr. E. S. 2nd Ser. v. p. 101, pl. 11. f. 15, ♂.
Hab. New Granada.

11. E. Pausias, Felder, Reise der Novara, Zool. ii. 2. 290, t. xxxvi. f. 7, 8.
Hab. Bogotá.

12. E. Cacica, Felder, *l. c.* p. 290.
Hab. New Granada.

13. E. Inca, Saund. Tr. E. S. v. p. 227, pl. 21. f. 6, 6*a*, ♂.
Hab. Mexico, Guatemala.

14. E. Atahualpa, Saund. Tr. E. S. v. 2nd Ser. p. 101, pl. 11. f. 14, ♂.
Hab. New Granada.

15. E. Aristodorus (Bdv.), Morisse, Ann. S. E. F. vi. p. 420, ♂.
Hab. Cayenne, Amazons.

16. E. Pandama (Dbldy.), Saund. Tr. E. S. v. 222, pl. 20. f. 5, 5*a*, ♀.
Hab. Bahia.

17. E. Ocollo, Saund. Tr. E. S. 2nd Ser. v. p. 105, pl. 10. f. 6, 7, ♀.
Hab. New Granada.

Genus Diorhina.

Diorhina (Bdv.), Morisse, Ann. S. E. F. vi. p. 422.

1. D. Periander, Cram. pl. 188. f. C, ♀.
Iphinoe, Hbn. Samml. exot. Schm. iii., ♂ ♀; Godt. Enc. Méth. ix. p. 565. n. 7, ♂ ♀.
Laonome, Morisse, Ann. S. E. F. vi. p. 422, pl. 14. f. 5, 6, ♂.
Hab. Venezuela, Surinam, Amazons.

2. D. Dysonii, Saund. Tr. E. S. v. 218, pl. 20. f. 1, 1 *a*, ♂, 2, 2 *a*, ♀.
Hab. Venezuela.

3. D. psecas, Saund. Tr. E. S. v. p. 219, pl. 20. f. 4, 4 *a*, ♂.
Local var. *Laodamia*, Feld. Wien. ent. Monats. 1862, p. 71; Reise der Novara, Zool. ii. 2. p. 289.
Hab. Bolivia, Upper Rio Negro.

4. D. Butes, Clerck, Icones, pl. 46. f. 6 (1759).
Licarsis, Fab. E. S. iii. 1. 83. 28 (1793); Bdv. Sp. Gén. pl. 20. f. 6; Morisse, Ann. S. E. F. vi. pl. 14. f. 1, 2. Butler, Ent. M. Mag. i. p. 54.

♀?, *Rhetus*, Cram. pl. 63. f. G (1775).
Huana, Saund. Tr. E. S. 2nd ser. v. p. 100, ♂.
Rhetus Crameri, Swains. Zool. Ill. 2nd ser. t. 33.
Hab. Surinam, Amazons.

5. D. Thia, Morisse, Ann. S. E. F. vi. p. 419, t. 14. f. 3, 4.
?Local var. *Butes*.
Hab. Mexico, Honduras.

Genus Zeonia.

Zeonia (Swainson), Westw. D. W. & H. Gen. D. L. p. 431.

1. Z. Xantippe, Gray, Griffith's An. K. pl. 102. f. 1 (1832); D. W. & H. Gen. D. L. pl. 72. f. 4.
Morissei (Bdv.), Morisse, Ann. S. E. F. vi. p. 427, pl. 14. f. 7, 8 (1838).
Hab. S. Brazil.

2. Z. Heliconides, Swains. Zool. Ill. 2nd ser. pl. iii; Morisse, Ann. S. E. F. vi. p. 428; Saund. Trans. E. S. 2nd ser. v. pl. x. f. 5, ♀.
Hab. N. Brazil.

3. Z. Timandra, Saund. Tr. E. S. v. p. 228, pl. 23. f. 1, 1 *a*.
Hab. Brazil.

4. Z. sylphina, n. s., *suprà*, p. 383.
Hab. Ecuador.

5. Z. Chorinæus, Cram. pl. 59. f. A (1775).
Octavius, Fab. Mant. ii. 72. 9 (1787); Morisse, Ann. S. E. F. vi. p. 426.
Faunus, Fab. Sp. Ins. ii. 93. 15 (1781).
Hab. Surinam, Amazons, Maranham.

6. Z. Amazona, Saund. Tr. E. S. 2nd ser. v. p. 97, pl. x. f. 3, 4, ♂ ♀.
Hab. Upper Amazons.

7. Z. Bogota, Saund. Tr. E. S. 2nd ser. v. p. 98.
Hab. Bogotá.

8. Z. Batesii, Saund. Tr. E. S. v. 2nd ser. p. 99, pl. x. f. 1, 2, ♂ ♀.
Hab. Tapajos.

Genus Pheles.

Pheles (Boisd.), Herrich-Schäffer, Exot. Schmett. p. 77.

1. Ph. Heliconides, H.-Schäff. Exot. Schm. p. 77, f. 30.
Hab. Surinam, Amazons.

2. Ph. rufotincta, n. s., *suprà*, p. 379.
Hab. Upper Amazons.

Genus Ithomeis.

Ithomeis, Bates, Trans. Linn. Soc. vol. xxiii. p. 541 (Sept. 1862).
Ithomiopsis, Felder, Wien. ent. Monats. p. 411 (Dec. 1862).

1. I. AURANTIACA, Bates, Tr. L. S. xxiii. p. 541.
Hab. Amazons.

2. I. STALACHTINA, Bates, Tr. L. S. xxiii. p. 541.
Hab. Amazons.

3. I. HELICONINA, Bates, Tr. L. S. xxiii. p. 542.
Hab. Amazons.

4. I. MIMICA, Bates, Tr. L. S. xxiii. p. 542.
Hab. Amazons.

5. I. CORENA, Feld. Wien. ent. Monats. 1862, p. 412.
Hab. Maracaibo.

6. I. SATELLITES, Bates, Tr. L. S. xxiii. p. 542.
Hab. R. Tapajos.

7. I. ASTRÆA, Felder, Wien. ent. Monats. 1862, p. 412.
Hab. Bogotá.

Genus OREAS.

Oreas, Felder, Reise der Novara, Zool. ii. 2. p. 305.

1. O. MARATHON, Felder, l. c. p. 105, t. xxxviii. f. 23, 24.
Hab. Bogotá.

2. O. CTESIPHON, Felder, l. c. p. 305.
Hab. Bogotá.

Genus ISAPIS.

Isapis (Dbldy.), Westw. in D. W. & H. Gen. D. L. p. 465.

1. I. AGYRTUS, Cram. pl. 183. f. B, C; D. W. & H. pl. 72. f. 5.
Hab. Surinam, Amazons.

Genus LEPRICORNIS.

Lepricornis, Felder, Reise der Novara, Zool. ii. 2. p. 307.

1. L. MELANCHROIA, Feld. l. c. p. 307, t. xxxviii. f. 25.
Hab. Mexico.

Genus CHAMÆLIMNAS.

Chamælimnas, Felder, Reise der Novara, Zool. ii. 2. p. 304.

1. CH. ÏÆRIS, n. s., *suprà,* p. 378.
Hab. Upper Amazons.

2. CH. BRIOLA, n. s., *suprà,* p. 379.
Hab. Ucayali, Amazons.

3. CH. TIRCIS, Feld. l. c. p. 304, t. xxxv. f. 17, 18, ♂ ♀.
Hab. Bahia.

Genus SYRMATIA.

Syrmatia (Hübn.), Westw. in D. W. & H. Gen. D. L. p. 426.

1. S. DORILAS, Cramer, pl. 48. f. C; D. W. & H. Gen. D. L. pl. 70. f. 3.
Nyx, Hübn. Samml. exot. Schm. i.
Hab. Brazil.

2. S. ASTERIS, G. R. Gray, Griffith's An. K. Ins. pl. 102. f. 2.
Hab. Brazil.

3. S. LAMIA, n. s., *suprà*, p. 379.
Hab. Upper Amazons.

Genus BARBICORNIS.

Barbicornis, Godart, Enc. Méth. ix. p. 705.

1. B. BASILIS, Godt. Enc. Méth. ix. p. 706; Bdv. Sp. Gén. pl. 20. f. 3.
Hab. Brazil.

2. B. MONA, Hewits. in D. W. & H. Gen. D. L. pl. 70. f. 2.
Hab. —— ?

Genus MONETHE.

Monethe, Westw. in D. W. & H. Gen. D. L. p. 462.

1. M. ALPHONSUS, Fab. E. S. iii. 1. 308. 171.
Hab. Brazil.

2. M. ALBERTUS, Felder, Wien. ent. Monats. 1862, p. 73.
Hab. Amazons, Upper Rio Negro.

Genus ORESTIA.

Orestia, Felder, Wien. ent. Monats. 1862, p. 73.

1. O. VITULA.
Limnas vitula, Hewits. Exot. Butt. Lim. f. 5.
Hab. Upper Amazons.

2. O. TAPAJONA, n. s., *suprà*, p. 381.
Hab. Tapajos, Amazons.

Genus METAPHELES.

Metapheles, Bates, Entom. Monthly Mag. iii. p. 155.

1. M. DINORA, Bates, Ent. M. M. iii. p. 155.
Hab. Veragua.

Genus TMETOGLENE.

Tmetoglene, Feld. Wien. ent. Monats. 1862, p. 235; Reise der Novara, Zool. ii. 2. p. 306 (1865).

Brachyglenis, Felder, Wien. ent. Monats. 1862, p. 73 (nom. præocc.).

1. T. ESTHEMA, Feld. W. ent. M. 1862, p. 73; Reise der Novara, Zool. p. 306, pl. xxxviii. f. 15, 16.
Hab. Upper Rio Negro.

Genus ESTHEMOPSIS.

Esthemopsis, Reise der Novara, Zool. ii. 2. p. 306.
Pseudopheles, Bates, Tr. Ent. Soc. v. 3rd ser. p. 544.

1. E. CLONIA, Felder, Reise der Novara, Zool. ii. 2. p. 306, pl. xxxviii. f. 15, 16.
Hab. Upper Rio Negro, Bogotá.

2. E. ALICIA, Bates, Entom. Monthly Mag. i. p. 203 (*Pheles Alicia*).
Hab. Guatemala.

3. E. SERICINA.
Pseudopheles sericina, Bates, Trans. Ent. Soc, 3rd ser. vol. v. p. 544.
Hab. Maranham, Pará, Upper Amazons.

4. E. CELINA, n. s., *suprà*, p. 379.
Hab. Ega.

5. E. LITHOSINA, n. s., *suprà*, p. 380.
Hab. Tunantins, Upper Amazons.

6. E. ÆOLIA, n. s., *suprà*, p. 380.
Hab. Tapajos.

B. *Antennæ ringed or spotted with grey, fore-wing subcostal emitting its second branch before the end of the cell*.*

a. *Palpi not projecting beyond the forehead.*

Genus SISEME.

Siseme, Westwood in D. W. & H. Gen. D. L. p. 462.

1. S. ARISTOTELES, Latr. in Humboldt & Bonpl. Zool. p. 243. pl. 24. f. 5, 6.
Hab. New Granada.

2. S. PALLAS, Latr. Humb. & Bonpl. Zool. p. 244, pl. 24. f. 7, 8.
Hab. New Granada.

3. S. NEURODES, Felder, Wien. ent. Monats. 1861, p. 98; 1862, p. 71, ? var. *Pallas.*
Hab. Venezuela, Ecuador, Peru, Upper Rio Negro.

4. S. MINERVA, Felder, Reise der Novara, Zool. ii. 2. 308, t. xxxvi. f. 14, 15.
Hab. New Granada.

5. S. XANTHOGRAMMA, n. s., *suprà*, p. 384.
Hab. E. Peru.

6. S. SPRUCEI, n. s., *suprà*, p. 384.
Hab. Ecuador.

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* Except in *Helicopis Cupido.*

7. S. CAUDALIS, n. s., *suprà*, p. 384.
Hab. E. Peru.

8. S. ALECTRYO, Westw. D. W. & H. Gen. D. L. p. 463, pl. 72. f. 10.
Hab. New Granada.

Genus RIODINA.

Riodina, Westwood, D. W. & H. Gen. D. L. p. 430.

1. R. LYSIPPUS, Linn. S. N. ii. 793. 250; Clerck, Icones, t. 22. f. 3, 4; Cramer, pl. 380. f. A.
Hab, Guiana, Amazons.

Genus AMARYNTHIS.

Amarynthis (Hübn.), Westwood, D. W. & H. Gen. D. L. p. 443.

1. A. MENERIA, Cram. pl. 94. f. D, E; D. W. & H. pl. 70. f. 7, ♂ (1779).
Mæcenas, Fab. E. S. iii. 1. 306. 160 (1793).
Micalia, Cram. pl. 94. f. F, ♀.
Hab. Surinam, Amazons.

2. A. HYPOCHALYBE, Felder, Wien. ent. Monats. 1861, p. 98; Reise der Novara, Zool. ii. 2. p. 293, t. xxxvii. f. 21, 22.
Hab. Bogotá.

Genus ZELOTÆA, n. g., *suprà*, p. 381.

1. Z. PHASMA, n. s., *suprà*, p. 382.
Hab. Upper Amazons.

2. Z. DUBIA, n. s., *suprà*, p. 382.
Hab. Pará.

3. Z. ACHROA, n. s., *suprà*, p. 382.
Hab. Tapajos, Amazons.

Genus DYSMATHIA, n. g., *suprà*, p. 382.

1. D. PORTIA, n. s., *suprà*, p. 383.
Hab. Pará.

2. D. COSTALIS, n. s., *suprà*, p. 383.
Hab. Upper Amazons.

3. D. AREUTA.
Pandemos Areuta, D. W. & H. Gen. D. L. pl. 70. f. 5.
Hab. Pernambuco.

Genus HELICOPIS.

Helicopis (Fabr. Syst. Gloss.), Westwood, D. W. & H. Gen. D. L. p. 423.

1. H. ENDYMION, Cram. pl. 244. f. C, D, E, F (1782).
Gnidus, Fab. Mant. ii. 607. 64 (1787); (transformations) Stoll, Suppl. Cram. pl. 4. f. 5.
Hab. Surinam, Amazons.

2. H. **Selene**, Felder, Reise der Novara, Zool. ii. 2. p. 289.
Hab. Surinam.

3. H. **Cupido**, Linn. S. N. ii. 787. 217; Roesel, Ins. Bel. iv. t. 3. f. 7; Cramer, pl. 164. f. D, E, F, G; (transformations) Stoll, Suppl. Cram. pl. 4. f. 6.
Hab. Surinam, Amazons.

Genus Anteros.

Anteros (Hübn.), Westw. D. W. & H. Gen. D. L. p. 427.

1. A. **Chrysus**, Cram. pl. 380. f. D, E (fig. bad).
Hab. Surinam, Amazons.

2. A. **Dematria**, D. W. & H. Gen. D. L. pl. 71. f. 10.
Local var. of *Chrysus*?
Hab. Honduras.

3. A. **acanthoïdes**.
Nymphidium acanthoïdes, Herr.-Schäff. Exot. Schm. f. 49, 50.
Hab. Amazons.

4. A. **Gyas**, Cramer, pl. 28. f. F, G.
Acanthus, Cramer, pl. 380. f. K, L (dark var.).
Charis Acanthus, Westw. D. W. & H. Gen. D. L. p. 453.
Charis Gyas, id.
Hab. Surinam, Amazons.

5. A. **Carausius**, Westw. D. W. & H. Gen. D. L. p. 428; Hew. Exot. Butt. Anteros, f. 3, 4.
Hab. Mexico.

6. A. **Axiochus**, Hewits. Exot. Butt. Anteros, f. 1, 2.
Hab. Brazil.

7. A. **Renaldus**, Stoll, Suppl. Cram. t. 13. f. 1, 1*a* (fig. bad in outline); D. W. & H. pl. 70. f. 6.
Hab. Surinam, Brazil, Amazons.

8. A. **Ampyx**, Drury, Ill. iii. pl. 9. f. 2, 3.
Hab. Rio Janeiro.

9. A. **Achæus**, Cram. pl. 352. f. G, H (tails exaggerated).
Hab. Surinam, Amazons.

10. A. **bracteata**, Hewits. Exot. Butt. Anteros, f. 11, 12, ♂ ♀.
Hab. Amazons.

11. A. **formosus**, Cramer, pl. 118. f. G (1779).
Valens, Fab. Mant. ii. 644. 67 (1787).
Formosus, Fab. *l. c.* 632.
Valens, Perty, Del. Anim. Art. Bras. pl. 30. f. 3, 3*b*.
Hab. Surinam, Amazons.

12. A. Chrysoprasta (Bates), Hewits. Exot. Butt. Anteros, f. 7, 8.
Hab. Amazons.

13. A. Allectus, Westw. D. W. & H. Gen. D. L. p. 428; Hewits. Exot. Butt. Anteros, f. 5, 6.
Hab. Amazons.

14. A. Otho, Westw. D. W. & H. Gen. D. L. p. 428; Hewits. Exot. Butt. Anteros, f. 9, 10.
Hab. Amazons.

Genus Parnes.

Parnes (Dbldy.), Westw. D. W. & H. Gen. D. L. p. 464.

1. P. Nycteis (Bdv.), Westw. D. W. & H. Gen. D. L. p. 464, pl. 73. f. 3.
Hab. Amazons.

2. P. Philotes (Dbldy.), Westw. D. W. & H. Gen. D. L. p. 464.
Hab. Amazons.

Genus Emesis.

Emesis (Fabr. Syst. Gloss.), Westw. D. W. & H. Gen. D. L. p. 446.
Nimula, Blanch. Anim. Art. iii. p. 465 (nec *Nymula,* Bdv.).

1. E. Lucinda, Cram. pl. 1. f. E, F, ♂; Fab. Mant. ii. 319. 30, ♂.
Dyndima, Cram. pl. 271. f. G, H, ♀.
Hab. Surinam, Amazons.

2. E. fastidiosa, Ménétr. Cat. St. Petersb. p. 90, pl. iii. f. 5.
Hab. Rio Janeiro.

3. E. spreta, n. s., *suprà,* p. 385.
Hab. Upper Amazons.

4. E. Tenedia, Felder, Wien. ent. Monats. 1861, p. 99.
Hab. Venezuela, New Granada, Guatemala.

5. E. Cypria, Feld. Wien. ent. Monats. 1861, p. 99: Reise der Novara, Zool. ii. 2. p. 293, t. xxxvi. f. 12, 13.
Hab. Venezuela, New Granada.

6. E. ocypore, Hübn. Zutr. f. 989-990, ♂.
Hab. "Africa" (?).

7. E. hypochloris, n. s., *suprà,* p. 385.
Hab. Upper Amazons.

8. E. Mandana, Cram. pl. 271. f. E, F (1782).
Arminius, Fab. E. S. iii. 1. 478. 155 (1723).
Ops, Latr. Humb. & Bonpl. Zool. vol. ii. pl. 27. f. 3, 4.
Hab. Surinam, Amazons, New Granada.

9. E. Tolteca, Reakirt, Proc. Ac. Sci. Philadelph. 1866, p. 248.
Hab. Mexico.

10. E. Aurelia, Bates, Trans. Ent. Soc. 3rd. ser. vol. v. p. 544.
Hab. Maranham, interior.

11. E. æthalia, Bates, *suprà*, p. 385.
Hab. Santa Martha, New Granada.

12. E. Fatimella, Westw. D. W. & H. Gen. D. L. p. 447.
Fatima, Cram. pl. 271. f. C, D.
Hab. New Granada.

13. E. Diogenia, Prittwitz, Stettin. ent. Zeit. 1865, p. 314.
Hab. Brazil.

Genus Symmachia.

Symmachia (Hübn.), Westw. D. W. & H. Gen. D. L. p. 444.
Caria, Hbn., Erichs.
Synapta, Felder, Reise der Novara, Zool. ii. 2. p. 294.

1. S. Fatima, Cram. pl. 271. f. A, B (1782).
Ovidius, Fab. E. S. iii. 1. 320. 212 (1793); D. W. & H. Gen. D. L. pl. 72. f. 6.
Hab. Surinam, Amazons.

2. S. Emesia, Hewits. Exot. Butt. Sym. f. 7.
Hab. Nicaragua.

3. S. Argiope, Godt. Enc. Méth. ix. 573. 44 (1819).
Caria Colubris, Hübn. Zutr. f. 251, 252 (1823).
Paridion, Dalm. Anal. Ent. p. 44 (1823).
Hab. Bahia, Brazil.

4. S. Amazonica, n. s., *suprà*, p. 393.
Hab. Upper Amazons.

5. S. Mantinea, Feld. Wien. ent. Monats. 1861, p. 99, ♀.
Hab. Ecuador.

6. S. Arete, Feld. Wien. ent. Monats. 1861, p. 98, ♂.
Hab. Ecuador.

7. S. Plutargus, Fab. E. S. iii. 1. 325. 234; Donovan, Ins. India, pl. xlviii. f. 3.
Hab. —— ?

8. S. Castalia, Ménétr. Cat. St. Pétersb. p. 89, pl. iii. f. 4.
Hab. Brazil.

9. S. galbula, Feld. Wien. ent. Monats. 1861, p. 99.
Hab. Caraccas.

10. S. trochilus.
Caria trochilus, Erichs. Schomburgk's Reise, Brit. Gui. iii. p. 601, ♀.
Hab. British Guiana, Upper Amazons.

11. S. Domitianus, Fab. E. S. iii. 1. 315. 193.
Hab. New Granada (mouth of Magdalena), Nicaragua, Guadeloupe.

12. S. ARCUATA, Hewits. Exot. Butt. Sym. f. 1.
Hab. Amazons (*Wallace*).

13. S. PRAXILA (Dbldy.), D. W. & H. Gen. D. L. pl. 73. f. 1, ♀.
Hab. Rio Janeiro.

14. S. ACCUSATRIX, Westw. D. W. & H. Gen. D. L. p. 445, ♂ ♀.
Hab. Amazons.

15. S. PROBETOR, Cram. pl. 390. f. I, ♂.
Hab. Surinam, Amazons.

16. S. CALLISTE (Bates), Hewits. Exot. Butt. Sym. f. 9.
Hab. Pará.

17. S. ARION.
Synapta Arion, Felder, Reise der Novara, Zool. ii. 2. p. 294, t. xxxvi. f. 20, 21.
Hab. ——?

18. S. MENETAS, Drury, Ill. iii. pl. 8. f. 3 (1783).
Menetes, Stoll, Suppl. Cram. pl. 30. f. 4 (1791)?
Tacitus, Fab. E. S. iii. 1. 308. 168 (1793).
Hab. South Brazil.

19. S. RUBINA, Bates, Entom. Monthly Mag. iii. p. 155.
Hab. Panamá.

20. S. TIGRINA (Bates), Hewits. Exot. Butt. Sym. f. 2.
Hab. Pará.

21. S. HETÆRINA (Bates), Hewits. Exot. Butt. Sym. f. 10.
Hab. R. Tapajos.

22. S. PARDALIS (Bates), Hewits. Exot. Butt. Sym. f. 11.
Hab. St. Paulo, Upper Amazons.

Genus CRICOSOMA.

Cricosoma, Felder, Reise der Novara, Zool. ii. 2. p. 292.

1. C. HIPPEA.
Symmachia Hippea, Herr.-Schäff. Exot. Schm. p. 77. f. 39, 40.
Hab. Amazons.

2. C. LEOPARDINUM, Felder, Reise der Novara, Zool. ii. 2. p. 293. t. xxxvii. f. 29, 30.
Local var.? *Symmachia Hilaria* (Bates), Hewits, Exot. Butt. Sym. f. 5.
Hab. Bahia, Amazons.

3. C. CALLIGRAPHUM.
Symmachia Calligrapha (Bates), Hew. Exot. Butt. Sym. f. 3.
Hab. Ega, Amazons.

4. C. NORINA.
Symmachia Norina (Bates), Hew. Exot. Butt. Sym. f. 4.
Hab. R. Tapajos, Amazons.

5. C. ERASTE, n, s., *suprà*, p. 385.
Hab. Upper Amazons.

6. C. PHÆDRA, n. s., *suprà*, p. 386.
Hab. Tapajos, Amazons.

Genus MESENE.

Mesene (Bdv.), West. D. W. & H. Gen. D. L. p. 441.

1. M. SOPHISTES, n. s., *suprà*, p. 386.
Hab. Amazons.

2. M. CINGULUS, Stoll, Suppl. Cram. pl. 13. f. 4.
Bœotis Cingulus, Westw. D. W. & H. Gen. D. L. p. 452.
Hab. Surinam, Amazons.

3. M. ÆROPE.
Bœotis Ærope, Westw. D. W. & H. Gen. D. L. pl. 71. f. 2, ♂.
Hab. Amazons.

4. M. NUMITOR, Fab. E. S. iii. 1. 324. 228; Donov. Ins. India, pl. 44. f. 3.
Hab. "Indies."

5. M. FULIGINEA, n. s., *suprà*, p. 386.
Hab. Lower Amazons.

6. M. PYRSODES, n. s., *suprà*, p. 386.
Hab. Upper Amazons.

7. M. BOMILCAR, Stoll, Suppl. Cram. pl. 39. f. 3, ♂.
Hab. Surinam, Amazons.

8. M. PHAREUS, Cram. pl. 170. f. C (1779); Fab. Mant. ii. 722. 79; Hübn. Samml. exot. Schmett. i.
Hab. Surinam, Amazons.

9. M. RUBEELLA, Bates, Entom. Monthly Mag. i. p. 204.
Hab. Panamá.

10. M. CROCEELLA, Bates, Entom, Monthly Mag. i. p. 204.
Hab. Guatemala.

11. M. LEUCOPHRYS, n. s., *suprà*, p. 387.
Hab. Amazons.

12. M. HYA (Bdv.), D. W. & H. Gen. D. L. pl. 70. f. 9, ♂.
? *Emesis monostigma*, Erichs. Schomb. Reise Brit. Gui. iii. p. 601.
Hab. Amazons.

13. M. HYALE, Felder, Reise der Novara, Zool. ii. 2. p. 292.
Hab. Bogotá.

14. M. PARAENA, n. s., *suprà*, p. 387.
Hab. Pará.

15. M. FENESTRELLA, n. s., *suprà*, p. 387.
Hab. Upper Amazons.

16. M. MARGARETTA, White, Zoologist, 1843, p. 28.
Semiradiata, Felder, Reise der Novara, Zool. ii. 2. p. 292. t. xxxvii. f. 27, 28.
Hab. Bogotá, Honduras.

17. M. THELEPHUS, Cram. pl. 66. f. E, F, ♂ (1776).
Telephus, Fab. Mant. ii. 78. 710 (1787). *Alphæa*, Hübn. Samml. exot. Schmett. i. *Timandra*, Godt. Enc. Méth, ix. 583, 100.
Hab. Surinam, Cayenne, Amazons.

18. M. ARGENTEA, Bates, Entom. Monthly Mag. iii. 154.
Hab. Guatemala.

19. M. SIMPLEX. n. s., *suprà*, p. 387.
Hab. Pará.

20. M. CELETES, n. s., *suprà*, p. 387.
Hab. Pará.

21. M. NOLA, Herr.-Schäff. Exot. Schm. p. 77. f. 23.
Hab. Amazons.

22. M. EUPTERYX, n, s., *suprà*, p. 389.
Hab. Pará.

23. M. NYDIA, n. s., *suprà*, p. 389.
Hab. Upper Amazons.

24. M. PYRRHA, n. s., *suprà*, p. 389.
Hab. Upper Amazons.

25. M. EPAPHUS, Cramer, pl. 335. f. D, E.
Hab. Surinam, Amazons.

26. M. EPALIA, Hübn. Zutr. f. 921, 922, ♂.
? *Epalia*, Godt. Enc. Méth. ix. 588. 116.
Hab. Brazil.

27. M. SAGARIS, Cram. pl. 83. f. D, ♂.
♀ *Satnius*, Dalman, Anal. Ent. p. 45.
Episatnius, Prittwitz, Stettin. ent. Zeit. 1865, p. 313.
Hab. Guiana, Amazons, Brazil.

28. M. TRICOLOR.
Symmachia tricolor (Bates), Hew. Exot. Butt. Sym. f. 6.
Hab. Ega.

29. M. NIGROCINCTA, Scheller, Papill. de Surinam, pl. 106 (fig. bad).
Hab. Surinam.

30. M. BASILISSA, n. s., *suprà*, p. 388.
Hab. Pará.

31. M. DEBILIS, n. s., *suprà*, p. 388.
Hab. Tapajos, Amazons.

32. M. APOLECTA, n. s., *suprà*, p. 388.
Hab. Tapajos, Amazons.

33. M. CROCOSTIGMA, n. s., *suprà*, p. 388.
Hab. Upper Amazons.

Genus PACHYTHONE, n. g., *suprà*, p. 389.

1. P. EREBIA, n. s., *suprà*, p. 390.
Hab. Ega, Amazons.

2. P. LATERITIA, n. s., *suprà*, p. 390.
Hab. Tapajos and Ega, Amazons.

3. P. DISTIGMA, n. s., *suprà*, p. 390.
Hab. Pará.

4. P. XANTHE, n. s., *suprà*, p. 391.
Hab. Ega, Amazons.

5. P. MIMULA, n. s., *suprà*, p. 391.
Hab. Santarem, Amazons.

Genus CALYDNA.

Calydna (Dbldy.) Westw. D. W. & H. Gen. D. L. p. 436.

* *Eyes naked.*

1. C. ARGIELLA, n. s., *suprà*, p. 394.
Hab. Brazil.

2. C. TINEA, n. s., *suprà*, p. 394.
Hab. Pará.

3. C. MACULOSA, n. s., *suprà*, p. 394.
Hab. St. Paulo, Amazons.

4. C. THERSANDER, Cram. pl. 335. f. A, B.
Hab. Surinam, Amazons.

5. C. CEA, Hewits. Exot. Butt. Cal. f. 16, 17.
Hab. Amazons,

6. C. EUTHRIA (Dbldy.), D. W. & H. Gen. D. L. pl. 70. f. 10, ♀.
Hab. Honduras.

7. C. MICRA, n. s., *suprà*, p. 395.
Hab. Tapajos, Amazons.

8. C. STURNULA, Hübn. Zutr. f. 995, 99, 6, ♀.
Hab. Brazil, Amazons.

9. C. Hiria, Godt. Enc. Méth. ix. 584. 95, ♂.
Calitas, Hew. Exot. Butt. Cal. f. 7, ♂.
Hab. Brazil, Amazons.

10. C. lusca, Hübn. Samml. exot. Schm. iii.
Hab. Brazil.

11. C. Catana, Hewits. Exot. Butt. Cal. f. 15.
Hab. Amazons.

12. C. Cabira, Hewits. Exot. Butt. Cal. f. 5, 6.
Hab. Amazons.

13. C. Carneia, Hewits. Exot. Butt. Cal. f. 13, 14.
Hab. Amazons.

14. C. Calyce, Hewits. Exot. Butt. Cal. f. 18.
Hab. Amazons.

15. C. Candace, Hewits. Exot. Butt. Cal. f. 19, 20.
Hab. Amazons.

16. C. caprina, Hewits. Exot. Butt. Cal. f. 8.
Hab. Amazons.

17. C. Charila, Hewits. Exot. Butt. Cal. f. 9, 10.
Hab. Amazons.

18. C. Caieta, Hewits. Exot. Butt. Cal. f. 1, 2.
Hab. Amazons.

19. C. Calamisa, Hewits. Exot. Butt. Cal. f. 3, 4.
Hab. Amazons.

** *Eyes hairy.*

20. C. Chaseba, Hewits. Exot. Butt. Cal. f. 8.
Hab. Amazons.

21. C. punctata, Feld. Wien. ent. Monats. 1861, p. 98; Reise der Novara, Zool. ii. 2. p. 291, t. xxxvi. f. 18, 19.
Hab. Ecuador.

22. C. castanea, Prittwitz, Stettin. ent. Zeit. 1865, p. 312.
Hab. S. Brazil.

Genus Charis.

Charis (Hübn.), Westw. D. W. & H. Gen. D. L. p. 452.

* *Eyes hairy.*

1. C. monogramma, n. s., *suprà*, p. 391.
Hab. Santarem, Amazons.

2. C. Cadmeis, Hew. Exot. Butt. Char. f. 1.
Hab. Amazons.

3. C. lypera, n. s., *suprà*, p. 392.
Hab. Ega, Amazons.

4. C. Chaonitis, Hew. Exot. Butt. Char. f. 7, 8.
Hab. Amazons.

5. C. Cleodora, Godt. Enc. Méth. ix. 573. 43.
Hab. Brazil.

6. C. Hermodora, Feld. Wien. ent. Monats. 1861, p. 99.
Hab. Venezuela.

7. C. Chelonis, Hew. Exot. Butt. Char. f. 9.
Hab. Rio Janeiro.

8. C. Theodora, Feld. Wien. ent. Monats. 1862, p. 72; Reise der Novara, Zool. ii. 2. p. 295, t. xxxvi. f. 22, 23, ♂.
Hab. Upper Rio Negro, Amazons.

9. C. Zama, n. s., *suprà*, p. 392.
Hab. Amazons, Brazil, Guiana, Central America.

10. C. avius, Cram. pl. 92. f. B; Godt. Enc. Méth. ix. 573. 41.
Hab. Guiana, Brazil.

11. C. Cleonus, Cram. pl. 380. f. H, I, ♂.
Hab. Guiana.

12. C. Caryatis, Hew. Exot. Butt. Char. f. 6, ♂.
Cleonus, Godt. Enc. Méth. ix. 573. 42.
Hab. Amazons.

13. C. Gynæa, Godt. Enc. Méth. ix. 573. 40.
Hab. Brazil.

14. C. Jessa.
Nymphidium Jessa, Bdv. Sp. Génér. pl. 6. f. 10.
Hab. Brazil.

15. C. Cæcias, Hew. Exot. Butt. Char. f. 2.
Hab. Upper Amazons.

16. C. argyrea, n. s., *suprà*, p. 392.
Hab. Ega, Amazons.

17. C. Cadytis, Hew. Exot. Butt. Char. f. 3.
Hab. Rio Grande.

18. C. ocellata.
Symmachia ocellata, Hew. Exot. Butt. Sym. f. 8.
Hab. Venezuela.

19. C.? Pheretima.
Crocozona Pheretima, Felder, Reise der Novara, Zool. ii. 2. p. 296. t. xxxvi. f. 16, 17, ♂.
Hab. Bogotá.

** *Eyes naked.*

20. C. Azora, Godt. Enc. Méth. ix. 572. 39.
Hab. Brazil.

21. C. CALICENE, Hew. Exot. Butt. Char. f. 4, 5, ♀.
? ♀ *Azora*, Godt.
Hab. ——?.

22. C. NILUS, Feld. Wien. ent. Monats. 1861, p. 100.
Hab. Venezuela.

23. C. CÆNEUS, Linn. S. N. ii. 796. 273.
Virginiensis (Bdv.), Guér. Icon. R. A. t. 81. f. 1.
Nymphidia pumila, Bdv. & Lec. Icon. Lép. Am. Sept. t. 37. f. 6, 7.
Hab. United States.

24. C. ARGYRODINES, Bates, Entom. M. Mag. iii. p. 154.
Hab. Guatemala, Nicaragua.

25. C. VENILIA, n. s., *suprà*, p. 393.
Hab. Tapajos and Pará.

26. C. PERONE (Dbldy.), D. W. & H. Gen. D. L. p. 453, pl. 71. f. 9.
Stilbe, Godt. Enc. Méth. ix. 574. 47 ?
Hab. Amazons.

27. C. TROCHILIA.
Bœotis trochilia, Westw. D. W. & H. Gen. D. L. p. 452.
Hab. Amazons.

28. C. GLAUCOPIS, n. s., *suprà*, p. 393.
Hab. Ega.

29? C. EPIJESSA, Prittwitz, Stettin. ent. Zeit. 1865, p. 315, ♂.
Hab. S. Brazil.

b. *Palpi projecting beyond the forehead.*

Genus BŒOTIS (Hbn.), *suprà*, p. 395.

1. B. HISBON, Cramer, pl. 83. f. C (1775); Westw. D. W. & H. Gen. D. L. p. 452.
Hab. Guiana, Amazons.

2. B. EUPREPES, n. s., *suprà*, p. 396.
Hab. Tapajos, Amazons.

3. B. MELANIS, Hübn. Zutr. f. 427, 428.
Hab. Brazil.

4. B. PRIMA, n. s., *suprà*, p. 396.
Hab. Tapajos and Upper Amazons.

Genus METACHARIS.

Metacharis, Butler, Entom. Monthly Mag. iii. p. 174.

*

1. M. PTOLOMÆUS, Fab. E. S. iii. 1. 319. 209, ♂; Donov. Ins. Ind. pl. 46. f. 6.
Lemonias Ptolomæus, Westw. D. W. & H. Gen. D. L. p. 459.

Lucius, Fab. E. S. iii. 1. 320. 211, ♀.
Hab. S. Brazil.

2. M. Agrius, Dalm. Anal. Ent. p. 46. n. 18.
Charis sylvestra, Ménétr. Cat. St. Petersb. t. 3. f. 6.
Hab. Brazil.

3. M. Nicaste, Herr.-Schäff. Exot. Schm. f. 47, 48, ♂.
M. Batesii, Butler, Ent. M. Mag. iii. p. 175, ♂ ♀.
Hab. Amazons.

4. M. regalis, Butler, Ent. M. Mag. iii. p. 175.
Hab. Amazons, Brazil.

5. M. cuparina, n. s., *suprà*, p. 396.
Hab. Tapajos, Amazons.

6. M. nigrella, n. s., *suprà*, p. 396.
Hab. Tapajos, Amazons.

** *Echenais*, Hübn.

7. M. Chia, Hübn, Zutr. f. 357, 358.
Hab. Surinam, Amazons.

8. M. exigua, n. s., *suprà*, p. 396.
Hab. Tapajos, Amazons.

9. M. erythromelas, Scheller, Ins. Surinam, pl. 29, ♂ ♀.
Hab. Surinam, Amazons.

Genus Lasaia, n. g., *suprà*, p. 397.

1. L. Meris, Cram. pl. 360. f. B, C, ♂.
Agesilas, Latr. in Humb. & Bonpl. Zool. pl. 25, f. 7, 8.
Hab. Central America, New Granada, Guiana, Amazons.

2. L. Cleadas.
Charis Cleadas, Hewits. Exot. Butt. *Charis*, f. 10.
Hab. R. Tapajos, Amazons.

Genus Tharops.

Tharops, Hübn. Verz. p. 109 (1816), Westw. D. W. & H. Gen. D. L. p. 458.

1. Th. Menander, Cram. pl. 334. f. C, D, ♀ (fig. bad); D. W. & H. Gen. D. L. pl. 71. f. 11, ♂.
Petronius, Fab. E. S. iii. 1, 324, 227?
Hab. Guiana, Amazons (Santarem).

2. Th. coruscans, Butler, Proc. L. S. Zool. vol. ix. p. 222.
Hab. Pará.

3. Th. nitida, Butler, Proc. L. S. Zool. ix. p. 223, pl. vi. f. 20, 21.
Hab. S. Brazil.

4. Th. Pretus, Cram. pl. 182. f. C, D, ♂.
Hab. Guiana, Amazons.

5. Th. Glaucoma, Hübn. Zutr. f. 927, 928, ♂.
Hab. Brazil.

6. Th. splendida, Butler, Proc. L. S. Zool. ix. p. 224, pl. vi. f. 24, 25.
Hab. Pará.

7. Th. superba, n. s., *suprà,* p. 397.
Hab. Amazons.

8. Th. Hebrus, Cramer, pl. 50. f. E, F.
Ion, Westw. D. W. & H. Gen. D. L. p. 458.
Hab. Guiana, Amazons.

9. Th. Cicuta.
Lemonias Cicuta, Hewits. Exot. Butt. Lem. f. 24, 25, 26. ♂ ♀.
Hab. Amazons.

10. Th. Felsina, Hewits. Exot. Butt. Lem. f. 27, 28, ♀.
Hab. Rio Janeiro.

Genus Lemonias.

Lemonias (Dbldy.), Westw. D. W. & H. Gen. D. L. p. 457.

*

1. L. Pione, n. s. *suprà,* p. 398.

** *Hypophylla,* Bdv. Sp. Gén. pl. 20.

2. L. Thara, Hew. Exot. Butt. Lem. 17, 18, ♂.
Hab. Amazons.

3. L. Rhesa, Hew. Exot. Butt. Lem. f. 15, 16, ♂.
Hab. Amazons.

4. L. Zeanger, Stoll, Suppl. Cram. t. 37. f. 2, 2 B, ♂.
Hab. Surinam.

5. L. cuprea, Butler, Proc. Linn. Soc. Zool. ix. p. 218, pl. vi. f. 17, 18.
Hab. Amazons.

6. L. Parthaon, Dalm. Anal. Entom. p. 46, ♂ (1823).
Thermodoë, Geyer in Hübn. Zutr. f. 715, 716, ♂ (1832).
Ancile, Hew. Exot. Butt. Lem. f. 31, ♀.
Hab. Brazil, Amazons.

7. L. Rhodope, Hew. Exot. Butt. Lem. f. 6, 7, ♂.
Ancile, Hew. Exot. Butt. f. 32, ♀.
Bubo, Butler, Proc. L. S. Zool. ix. p. 217, pl. vi. f. 14, 15, ♂ ♀.
Hab. Amazons.

8. L. Æmylius, Cram. pl. 66. f. G, H (1776) ♀; Fab. Mant. ii. 78. 711 (1787) ♀.
Crispus, Cram. pl. 118. f. D, E (not F) (1779), ♂.
Hab. Guiana, Amazons.

9. L. Pseudocrispus, Westw. D. W. & H. Gen. D. L. p. 459, ♂.
Crispus, Cram. pl. 118. f. F (not D, E), ♂.
Nepioides, Butler, Proc. L. S. Zool. ix. p. 217, pl. vi. f. 12, 13.
Hab. Guiana, Amazons.

10. L. melanogyra, Bates.
Luciana, Hübn. Samml. exot. Schm. i. ♂ (nec Fab.).
Hab. Pará.

11. L. nepia (Dbldy.), D. W. & H. Gen. D. L. p. 73. f. 2, ♀.
Nepia, Butler, Proc. L. S. Zool. ix. pl. vi. f. 11, ♂.
Lucianus, Fab. E. S. iii. 1. 313. 185, ♂?
Hab. Venezuela, "Guadeloupe," Fab.

12. L. Bolena, Butler, Proc. L. S. Zool. ix. p. 215, pl. vi. f. 8.
Hab. Brazil.

13. L. cruentata, Butler, Proc. L. S. Zool. ix. p. 221, pl. vii. f. 15.
Hab. Amazons.

14. L. Martialis, Felder, Reise der Novara, Zool. ii. 2. p. 301.
Hab. Surinam.

15. L. Cerealis, Hewits. Exot. Butt. Lem. f. 37, ♀.
Local(?) var. *Cæcina*, Felder, Reise der Novara, Zool. ii. 2. p. 301. t. xxxvii. f. 7, 8.
Hab. Amazons, Bahia.

16. L. Melia, n. s., *suprà*, p. 397.
Hab. Amazons.

17. L. Cilissa, Hew. Exot. Butt. Lem. f. 33, 34, ♂ ♀.
Hab. Nicaragua.

18. L. Zeurippe.
Hypophylla Zeurippe, Bdv. Sp. Gén. pl. 20. f. 5.
Hab. Mexico.

19. L. Sudias, Hew. Exot. Butt. Lem. f. 12, 13, 14, ♂ ♀.
Hab. Honduras, Guatemala.

*** *Calliona*, nobis.

20. L. Irene, Westw. D. W. & H. Gen. D. L. p. 459, ♂; Hew. Exot. Butt. Lem. f. 3, ♂; ♀, Butler, Proc. Linn. Soc. Zool. ix. pl. vii. f. 8.
Hab. Amazons.

21. L. Latona, Hew. Exot. Butt. Lem. f. 1, 2, ♂.
Hab. Amazons.

22. L. Siaka, Hew. Exot. Butt. Lem. f. 10, 11. ♂; ♀, *suprà*, p. 398.
Hab. Amazons.

**** *Hamearis* (pt.), Hübn. *Apodemia*, Felder, Butler.

23. L. Epulus, Cram. pl. 50. f. C, D; Hübn. Samml. i.
Hab. Guiana, Amazons.

24. L. CAMPESTRIS, n. s., *suprà*, p. 397.
Hab. Tapajos, Amazons.

25. L. AURINIA, Hew. Exot. Butt. Lem. f. 19, 20.
Hab. Amazons.

26. L. EROSTRATUS (Bdv.), D. W. & H. Gen. D. L. pl. 71. f. 4.
Hab. Venezuela.

27. L. CHILENSIS, Felder, Reise der Novara, Zool. ii. 2. p. 301. t. xxxvii. f. 13, 14.
Hab. Chili.

28. L. GLAPHYRA, D. W. & H. Gen. D. L. pl. 71. f. 3.
Hab. S. Brazil.

29. L. ALBINUS, Feld. Wien. ent. Monats. 1861, p. 101; Reise der Novara, Zool. ii. 2. p. 299. t. xxxvii. f. 1, 2, 3, 4, ♂ ♀.
Hab. Caraccas: Nova Granada.

30. L. CALIGINEA, Butler, Proc. L. S. Zool. ix. p. 226, pl. vii. f. 16.
Hab. Mexico.

31. L. PULCHERRIMA, Butler, Proc. L. S. Zool. ix. p. 226, pl. vi. f. 27.
Hab. Nauta, Amazons.

32. L. MORMO, Feld. Wien. ent. Monats. 1859, p. 271 n. 19.
Apodemia Mormo, Felder, Reise der Novara, Zool. ii. 2. p. 302, t. xxxvii. f. 15, 16.
Nemeobius dumeti, Behr, Proc. Calif. Ac. Nat. Sci. iii. pt. 3. p. 178 (Jan. 1865).
Hab. Utah, California.

33. L. VIRGULTI.
Nemeobius virgulti, Behr, Proc. Calif. Ac. Nat. Sci. iii. pt. 3. p. 178 (Jan. 1865).
Apodemia Sonorensis, Felder, Reise der Novara, Zool. ii. 2. p. 303 (Oct. 1865).
Hab. Los Angeles, Sonora.

34. L. MEJICANUS.
Nemeobius Mejicanus, Behr, Proc. Calif. Ac. Nat. Sci. iii. pt. 3. p. 179 (Jan. 1865).
Hab. Sierra Madre, Mazatlan, Mexico.

35. L. DOMINA, Bates, Ent. Month. Mag. i. p. 204.
Hab. Panamá.

36. L. STALACHTOIDES, Butler, Proc. L. S. Zool. ix. p. 228, pl. vii. f. 18.
Hab. Rio Janeiro.

37. L. COLCHIS, Felder, Reise der Novara, Zool. ii. 2. p. 300. t. xxxvii. f. 5, 6; Butler, Proc. L. S. Zool. ix. p. 228, pl. vi. f. 17.
Hab. S. Brazil.

***** *Calospila*, Westw. D. W. & H. Gen. p. 458.

38. L. Borsippa, Hewits. Exot. Butt. Lem. f. 35, 36.
Hab. Amazons.

39. L. Borsippina, Butler, L. S. Zool. ix. p. 219. pl. vi. f. 29.
Hab. Tapajos, Amazons.

40. L. senta, Hewits. Exot. Butt. Lem. f. 4, 5.
Hab. Amazons.

41. L. Balista, Hewits. Exot. Butt. Lem. f. 22, 23.
Hab. Amazons.

42. Alector, Hübn. Zutr. f. 927, 928.
Hab. Brazil.

43. L. apotheta, n. s., *suprà*, p. 399.
Hab. Brazil.

44. L. Galena, n. s., *suprà*, p. 398.
Hab. Amazons.

45. L. Penthea, Cram. pl. 143. f. E, ♂ (1779).
Pentheus, F. Mant. ii. 82. 734 (1787).
Auseris, Hewits. Exot. Butt. Lem. f. 21, ♀.
Hab. Guiana, Amazons.

46. L. Aristus, Stoll, Suppl. Cram. pl. 39. f. 4, 4*c*, ♀ (1791); D. W. & H. Gen. D. L. pl. 71. f. 12, ♂.
Leucocyana, Geyer in Hübn. Zutr. f. 915, 916 (1837).
Leucophæa, Hübn, Samml. ii.
Alector ♀, Butl. Proc. L. S. Zool. ix. p. 214. pl. vi. f. 1.
Violacea, Butl. Proc. L. S. Zool. ix. p. 214. pl. vi. f. 2, 3.
Hübneri, Butl. Proc. L. S. Zool. ix. p. 214. pl. vi. f. 4, 5.
Hab. Guiana, Amazons.

47. L. Aminias, Hew. Exot. Butt. Lem. f. 29.
Hab. Amazons.

48. L. hemileuca, n. s., *suprà*, p. 399.
Hab. Amazons.

49. L. Lampros, n. s. *suprà*, p. 399.
Hab. Amazons.

50. L. Æmulius, Fab. E. S. iii. i. 322. 19; Donov. Ins. Ind. pl. 44. f. 2.
Desmozona hemixanthe, Felder, Reise der Novara, Zool. ii. 2. p. 294, t. xxxvii. f. 17, 18.
Hab. S. Brazil.

****** *Anatole* (pt.), Hübn.

51. L, Zygia, Hübn. Samml. exot. Schm. i.
Caletor, Dalm. Anal. Ent. p. 44.
Epone, Godt. Enc. Méth. 580. 76.
Hab. Venezuela, Lower Amazons, Brazil.

52. L. **Egaensis**, Butler, Proc. L. S. Zool. ix. p. 225. pl. vi. f. 28, ♀.
Hab. Ega, Upper Amazons.

53. L. **Chea**, Hew. Exot. Butt. Lem. f. 38, ♀.
Hab. Amazons.

54. L. **Orpheus**.
Cremna Orpheus (Bdv), Westw. D. W. & H. Gen. D. L. p. 456, pl. 71. fig. 8.
Hab. Brazil.

******* *Thisbe*, Hübn.

55. L. **Belise**, Cram. pl. 376. f. E, F, ♂.
Irenæa, Cram. pl. 328. f. C, D, ♀.
Hab. Guiana, Amazons.

56. L. **Molela**, Hewits. Exot. Butt. Nymph. f. 23, 24, ♂.
Hab. Amazons.

Genus NYMPHIDIUM.

Nymphidium (Fab. Syst. Gloss.), Westw. D. W. & H. Gen. D. L. p. 447.

* *Nymula*, Bdv. Sp. Gén. pl. 20.

1. N. **Gnosis**, Bdv. Sp. Gén. pl. 20. fig. 4, ♂.
Emesis Gnosis, Westw. D. W. & H. Gen. D, L. p. 447.
Hab. Cayenne.

2. N. **Arctos**, Hewits. Exot. Butt. Nymph. f. 1, 2, ♂ ♀.
? Var. of *N. Gnosis*, Bdv.
Hab. Amazons.

3. N. **Tytia**, Cram. pl. 121. f. C, D, ♀ (1779).
Tytius, Fab. Sp. Ins. ii. 240. 52 (1781); Fab. E. S. iii. 1. 147. 48, ♀ (1793).
Eroe, Hewits. Exot. Butt. Nymph. f. 11, 12, ♀.
Hab. Surinam, Cayenne, Amazons.

4. N. **Apame**, Hewits. Exot. Butt. Nymph. f. 13, 14, ♂, 15, ♀.
Hab. Amazons.

5. N. **Phylleus**, Cram. pl. 63. f. D, E, ♂. ?=*Apame*, Hewits.
Hab. Surinam.

6. N. **Arche**, Hewits. Exot. Butt. Nymph. f. 10, ♀.
Hab. Amazons.

7. N. **Orestes**, Cramer, pl. 282. f. A, B, ♀.
Hab. Surinam, Amazons.

8. N. **Soranus**, Cram. pl. 353. f. A, B, ♂ (fig. very bad).
Hab. Surinam.

9. N. ODITES, Cram. pl. 11. f. E, F, ♀.
Hab. Surinam.

10. N. ABARIS, Cram. pl. 93. f. C, ♀.
♂. *Lemonias Sperthias*, Felder, Reise der Novara, Zool. ii. 2. p 297, t. xxxvii. f. 9, 10.
Hab. Surinam, Amazons.

11. N. PRÆCLARUM, Bates, Entom. M. Mag. iii. p. 156.
Hab. Panamá.

12. N. MYCONE, Hewits. Exot. Butt. Nymph. f. 16, 18, ♂ ♀.
Hab. Nicaragua.

13. N. REGULUS, Fab. E. S. iii. 1. 318. 205: Donov. Ins. India, pl. 43. f. 3.
Bœotis Regulus, Westw. D. W. & H. Gen. D. L. p. 452.
Hab. Brazil, Amazons.

** *Desmozona*, Bdv., Felder,

14. N. SYLVARUM, Bates, Trans. Ent. Soc. 3rd ser. vol. v. p. 545.
Hab. Amazons.

15. N. CHAONIA, Hewits. Exot. Butt. Nymph. f. 6, ♂.
Hab. Amazons.

16. N. MYCEA, Hewits. Exot. Butt. Nymph. f. 19.
Hab. New Granada.

17. N. DORILIS, Bates, Ent. M. Mag. iii. p. 156.
Hab. Panamá.

18. N. PELOPS, Cram. pl. 170. f. F.
Hab. Surinam, Amazons.

19. N. OCHRA, n. s., *suprà*, p. 399.
Hab. Amazons.

20. N. AGLE (Dbldy.), Hewits. Exot. Butt. Nymph. f. 3, ♂.
Hab. Amazons.

21. N. RUBIGO, n. s., *suprà*, p. 401.
Hab. Amazons.

22. N. GELA, Hewits. Exot. Butt. Nymph. f. 9, ♂.
Hab. Amazons.

23. N. CALYCE (Dbldy.), Felder, Wien. ent. Monats. 1862, p. 72.
Hab. Amazons, New Granada, Upper Rio Negro.

24. N. MESOLEUCUM, n. s., *suprà*, p. 401.
Hab. New Granada.

25. N. MOLPE, Hübn. Samml. exot. Schm. i.
Azanoides, Butler, Ent. M. M. iii. 222 (pt.).
Hab. Amazons.

26. N. Azan, D. W. & H. Gen. D. L. pl. 73. f. 5, ♀.
Lamis, Hübn. Samml. ex. Schm. ii. ♂ ♀.
Hab. Brazil.

27. N. Lamis, Cram. pl. 335. f. F, G, ♀; Fab. Mant. ii. 78. 714; Ent. Syst. iii. 1. 305. 157.
Hab. Surinam.

28. N. Lysimon, Stoll, Suppl. Cram. t. 39. f. 1, 1 A, ♂ (1791).
Platea (Bdv.), D. W. & H. Gen. D. L. pl. 73. f. 4, ♂.
Azanoides, Butler, Ent. M. Mag. iii. 222 (pt.).
Hab. Surinam, Amazons, Pernambuco.

29. N. Chimborazia, n. s., *suprà*, p. 400.
Hab. Ecuador.

30. N. fulminans, n. s., *suprà*, p. 400.
Hab. Amazons.

31. N. Phliasus, Cram. pl. 192. f. A, B.
Phillone, Godt. Enc. Méth. ix. 574. 50.
Hab. Guiana, Amazons, Brazil.

32. N. Lycorias, Hewits. Exot. Butt. Nymph. f. 7, 8, ♂ ♀.
Hab. Honduras, Guatemala.

33. N. Caricæ, L. Syst. Nat. ii. 792. 244; Clerck, Icones, t. 20. f. 2; Cram. pl. 170. f. E; transformations, Scheller, Ins. Surinam, pl. 111.
Hab. Guiana, Amazons.

34. N. Acherois, Bdv. Sp. Gén. pl. 21. f. 1.
Hab. Cayenne, Amazons.

35. N. Erymanthus, Ménétr. Cat. Mus. St. Pétersb. p. 90, t. vi. f. 6.
? Local var. of *Acherois*.
Hab. Minas Geraes.

36. N. epiplatea, Butler, Ent. M. M. ii. 222.
Hab. Pernambuco.

37. N. Ascolia, Hewits. Exot. Butt. Nymph. f. 4.
Hab. Amazons.

38. N. Cachrys, Fab. Mant. ii. 715. 78 (1787).
Damon, Stoll, Suppl. Cram. pl. 39. f. 5, 5 D (1791), ♂.
Menalcus, Cram. pl. 390. f. K? (fig. bad).
Onoba, Hewits. Exot. Butt. Nymph. f. 21. ♀?.
Hab. Surinam, Cayenne, Amazons.

39. N. Chione, Bates, Trans. Ent. Soc. 3rd ser. vol. v. p. 545.
Hab. Pará, Amazons.

40. N. Heliotis, n. s., *suprà*, p. 402.
Hab. Amazons.

41. N. EUTRAPELA, n. s., *suprà*, p. 401.
Hab. Amazons.

42. N. KADENII, Felder, Wien. ent. Monats. 1861, p. 101.
Lemonias Kadenii, Felder, Reise der Novara, Zool. ii. 2. p. 302, t. xxxvii. f. 11, 12.
Hab. Venezuela.

43. N. OMOIS, Hewits. Exot. Butt. Nymph. f. 20.
Hab. Amazons.

44. N. NINIAS, Hewits. Exot. Butt. Nymph. f. 22.
Hab. Amazons.

45. N. MANTUS, Cram. pl. 47. f. F, G; Fab. Mant. ii. 78. 717.
Desmozona Mantus, Bdv. Sp. Gén. pl. 6. f. 11.
Hab. Venezuela, Amazons, Guiana.

46. N. OLINDA, Bates, Ent. M. Mag. i. p. 204.
Hab. Panamá, Amazons.

47. N. BŒOTIA, Hewits. Exot. Butt. Nymph. f. 5.
Hab. Amazons.

48. N. LEUCOSIA, Hübn. Samml. exot. Schm. i.
Hab. Amazons.

Genus EUERYCINA.

Euerycina, Saunders, Trans. Ent. Soc. 2nd ser. v. p. 95, *suprà*, p. 402.

1. EU. CALPHURNIA, Saund. Tr. Ent. Soc. v. p. 221, pl. 20. f. 7, 7*a*, ♀; n. s. v. p. 106, pl. x. f. 8, ♂.
Hab. Amazons.

Genus CATAGRAMMINA, n. g., *suprà*, p. 1.

1. C. TAPAJA, Saunders.
Necyria Tapaja, Saund. Tr. Ent. Soc. n. s. v. p. 108, pl. xi. f. 17, 18, ♂.
Hab. Amazons.

Genus THEOPE.

Theope (Dbldy.), Westw. D. W. & H. Gen. D. L. p. 439.

1. TH. PIERIDOIDES, Felder, Reise der Novara, Zool. ii. 2. p. 292, t. xxxvii. f. 19, 20, ♂.
Hab. Bahia.

2. TH. EUDOCIA, D. W. & H. Gen. D. L. pl. 70. f. 4.
Hab. Amazons.

3. TH. PEDIAS, Herr.-Schäff. Exot. Schm. f. 24, 25. ♂.
Thelpusa, Hewits. Exot. Butt. Theo. f. 7, 8, ♀.
Hab. Amazons.

4. TH. HYPOXANTHE, n. s., *suprà*, p. 405.
Hab. Amazons.

5. TH. APHELES, n. s., *suprà*, p. 405.
Hab. Amazons.

6. TH. ZOSTERA, n. s., *suprà*, p. 405.
Hab. Amazons.

7. TH. THOOTES, Hew. Exot. Butt. Theo. f. 9, 10, ♀.
Hab. Amazons.

8. TH. THERITAS, Hew. Exot. Butt. Theo. f. 2, 3, ♂.
Hab. Amazons.

9. TH. SOBRINA, n. s., *suprà*, p. 405.
Hab. Amazons.

10. TH. SERICEA, n. s., *suprà*, p. 404.
Hab. Amazons.

11. TH. EXCELSA, n. s., *suprà*, p. 406.
Hab. Amazons.

12. TH. LAMPROPTERYX, n. s., *suprà*, p. 404.
Hab. Amazons.

13. TH. AUREONITENS, n. s., *suprà*, p. 405.
Hab. Amazons.

14. TH. HYPOLEUCA, n. s., *suprà*, p. 406.
Hab. Amazons.

15. TH. LYCÆNINA, n. s., *suprà*, p. 406.
Hab. Amazons.

16. TH. FOLIORUM, n. s., *suprà*, p. 407.
Hab. Amazons.

17. TH. SIMPLICIA, n. s., *suprà*, p. 406.
Hab. Amazons.

18. TH. LEUCANTHE, n. s., *suprà*, p. 408.
Hab. Amazons.

19. TH. AZUREA, n. s., *suprà*, p. 406.
Hab. Amazons.

20. TH. METHEMONA, n. s., *suprà*, p. 408.
Hab. Amazons.

21. TH. PUNCTIPENNIS, n. s., *suprà*, p. 407.
Hab. Amazons.

22. TH. ATIMA, n. s., *suprà*, p. 407.
Hab. Amazons.

23. Th. tetrastigma, n. s., *suprà*, p. 408.
Hab. Amazons.

24. Th. Virgilius, Fab. E. S. iii. 1. 323. 226.
Hab. "Indiis" Fab. (Honduras?), Nicaragua.

25. Th. cærulea, n. s., *suprà*. p. 408.
Hab. Brazil.

26. Th. nobilis, n. s., p. 410.
Hab. Amazons.

27. Th. Terambus, God. Enc. Méth. ix. p. 676. 182 (1819).
Lytæa, Hüb. Zutr. f. 901. 2 (1837).
Hab. Brazil.

28. Th. Publius, Feld. Wien. ent. Monats. 1861, p. 98.
Hab. Venezuela.

29. Th. basilea, Bates, Entom. M. Mag. iii. 1866, p. 155.
Hab. Panamá.

30. Th. syngenes, n. s., *suprà*, p. 409.
Hab. Amazons.

31. Th. Thebais, Hewits. Exot. Butt. Theo. f. 1, 4, ♂.
Hab. Amazons.

32. Th. Thestias, Hewits. Exot. Butt. Theo. f. 5, 6.
Hab. ——?

33. Th. Janus, Bates, Trans. Ent. Soc. 3rd ser. v. p. 546.
Hab. Maranham.

34. Th. discus, n. s., *suprà*, p. 409.
Hab. Amazons.

35. Th. Eurygonina, n. s., *suprà*, p. 410.
Hab. Amazons.

36. Th. Bahiana.
Aricoris Bahiana, Felder, Reise der Novara, Zool. ii. 2. p. 295, t. xxxviii. f. 3, 4, ♀.
Hab. Bahia.

37. Th. (?) Tutana, Godt. Enc. Méth. ix. p. 577.
Hab. Brazil.

38. Th. (?) Tisiphone, Westw. D. W. & H. Gen. D. L. p. 450, pl. 72. f. 7, ♂.
Hab. Brazil.

39. Th. drepana, n. s., *suprà*, p. 409.
Hab. Amazons.

40. Th. Phæo, Prittwitz, Stettin. ent. Zeit. 1865, p. 312.
Hab. S. Brazil. Ranges near *Theritas*, Hewits.

Genus PANDEMOS.

Pandemos (Hübn.), Westw. D. W. & H. Gen. D. L. p. 440.

1. P. ARCAS, Cram. pl. 179. f. E, F (1779); Fab. E. S. iii. 1. 157. 483 (1793).
Pasiphaë, Cram. pl. 80. f. E (1776?), ♀?
Hab. Surinam, Amazons.

Genus ARICORIS.

Aricoris (Bdv.), Westw. D. W. & H. Gen. D. L. p. 450 (1851).
Orimba, Herr.-Schäff. Exot. Schm. p. 55 (1856?).
Setabis (Dbldy.), Westw. *l. c.* p. 450.

1. A. EPITUS, Cram. pl. 270. f. C, ♀ (1782).
Butler, Proc. L. S. Zool. ix. pl. vii. f. 10, 12, 14, ♀.
Epigia, Godt. Enc. Méth. ix. p. 577 (1819), ♀.
Orimba cataleuca, Herr-Schäff. Exot. Schm. p. 55. f. 28, 29 (1856?), ♂.
Hab. Surinam, Amazons.

2. A. SERICA, Westw. D. W. & H. Gen. D. L. p. 450, pl. 72. f. 8, ♀; Butler, Proc. L. S. Zool. ix. pl. vii. f. 13, ♂.
Hab. Amazons.

3. A. LAGUS, Cram. pl. 117. f. F, G, ♂; Fab. E. S. iii. 1. 306. 159, ♂.
Polyommatus Lagus, Godt. Enc. Méth. ix. 680, ♂.
Pandemos Lagus, Westw. D. W. & H. Gen. D. L. p. 440, ♂.
Aricoris cyanea, Butler, Proc. L. S. Zool. ix. p. 221, pl. 7. f. 5, ♂.
Er. Pherephatte, Godt. Enc. Méth. ix. p. 590, ♀.
♀ *Limnas Pherephatte*, Westw. D. W. & H. Gen. p. 460.
A. Lagus, ♀, Butler, Proc. L. S. Zool. ix. pl. vii. f. 4.
♀ *Aricoris Petavia*, Felder, Reise der Novara, Zool. ii. 2. p. 295, t. xxxviii. f. 5, 6.
var. ♀ ? *A. inquinata*, Butler, Proc. L. S. Zool. ix. pl. vii. f. 1.
Hab. Surinam, Amazons, Cayenne.

4. A. PYTHIA, Hewits.
Lemonias Pythia, Hewits. Exot. Butt. Lem. f. 8, 9, ♂.
Aricoris myrtis (Dbldy.), Westw. D. W. & H. Gen. p. 450, ♀?
Hab. Amazons.

5. A. PYTHIOIDES, Butler.
Lemonias pythioides, Butler, Proc. L. S. Zool. ix. p. 220, pl. vii. f. 3, ♂.
Hab. Ega, Amazons.

6. A. BUTLERI, n. s. *infrà*, p. 459.
Hab. Tapajos.

7. A. AMETHYSTINA, Butler.
Lemonias amethystina, Butler, Proc. L. S. Zool. ix. p. 220, pl. vii. f. 7, ♂.
Hab. Tapajos.

8. A. GELASINE, n. s. *suprà*, p. 402, ♂ ♀.
♂ *A. Lagus*, Butler, Proc. L. S. Zool. ix. pp. 220 & 221, pl. vii. f. 2.
Hab. Ega, Amazons.

9. A. DISPARILIS, n. s., *suprà*, p. 403, ♂ ♀.
Hab. Amazons (Tapajòs).

10. A. VELUTINA, n. s., *suprà* p. 403, ♂ ♀.
Butler, Proc. Linn. Soc. Zool. ix. pl. vii. f. 11, ♂.
Hab. S. Paulo, Amazons.

11. A. FLAMMULA, n. s., *suprà*, p. 404.
Hab. Amazons.

Genus URANEIS, n. g., *suprà*, p. 411.

1. U. HYALINA.
Tharops hyalina, Butler, Proc. L. S. Zool. ix. pl. vi. f. 26, ♂.
♀, *suprà*, p. 412.
Hab. Amazons.

C. *Palpi projecting beyond the forehead. Antennæ not ringed with white. Median nervures forming an angle at the junction of the discocellulars; the latter, in the hind wing, joining the subcostal at a long distance above its bifurcation.* Stalachtinæ.

Genus STALACHTIS.

Stalachtis, Hübn. Verz. bek. Schmett. p. 27 (1816).
Syn. *Nerias* (Bdv.), Blanch. Anim. Artic. iii. p. 437 (1840).

1. S. PHLEGIA, Cram. pl. 197. f. F (1780?), pl. 236. f. C.
Phlegeus, Fab. Sp. Ins. ii. 127. 577 (1781).
Phlegetonia, Perty, Del. Anim. Art. t. 30. f. 2, ♀.
Hab. Brazil, Amazons, Guiana.

2. S. SUSANNA, Fab. Mant. ii. 16. 166 (1787); Hübn. Zutr. f. 425, 426 (1825); Bdv. Sp. Gén. pl. 11. f, 6.
Mechanitis Meriana, Esch. Kotzeb. Reise, p, 213, pl. viii. f. 19 (1821).
Hab. S. Brazil.

3. S. CALLIOPE, Linn. S. N. ii. 755, 756; Clerck, Icones, t. 41. f. 4; Cramer, pl. 246. f. C.
Hab. Guiana, Amazons.

4. S. EUGENIA, Cram. pl. 133. f. F.
Hab. Surinam.

5. S. MAGDALENA (Bdv.), D. W. & H. Gen. D. L. pl. 73. f. 6.
Hab. New Granada.

6. S. EUTERPE, Linn. S. N. ii. 756. 61; Cram. pl. 246. f. D.
Hab. Guiana, Amazons.

7. S. Phædusa, Hübn. Zutr. f. 13, 14, ♀.
Hab. Pará.

8. S. Duvalii, Perty, Del. Anim. Art. p. 153. pl. 30. f. 1, ♂.
Hab. Upper Amazons.

9. S. Zephyritis, Dalm. Anal. Ent. p. 47, ♂.
Hab. —— ?. (Cayenne?)

10. S. lineata, Guér. Icon. Règne Animal, texte, p. 473.
Hab. Pará.

11. S. Margarita, Felder, Reise der Novara, Zool. ii. 2. p. 310.
Hab. Surinam.

Genus incertæ sedis.

Ithomiola.

Ithomiola, Felder, Reise der Novara, Zool. ii. 2. p. 311.

1. I. floralis, Felder, l. c. p. 311.
Hab. Surinam.

Species described by Authors, not at present determinable.

1. Erycina eupolemia, Godart, Enc. Méth. ix. p. 572.
Hab. De l'Amérique.

2. Erycina Anapis, Godt. Enc. Méth. ix. p. 576.
Hab. Brazil.

3. Erycina Isala, Godt. Enc. Méth. ix. p. 579.
Hab. De l'Amérique Méridionale.

4. P. Archimedes, Fab. Ent. Syst. iii. 1. 320. 210.
Hab. "Indiis."
Probably a species of *Theope*.

5. Papilio Archytas, Stoll, Suppl. Cram. pl. v. f. 5, 5*a*.
Hab. Surinam.

6. P. Zachæus, Fab. Ent. Syst. v. Suppl. p. 431.
Hab. Cayenne.

7. P. Misenes, Cramer, pl. 117. f. D.
Hab. Surinam.
Probably a *Lycænide*.

8. P. polymenus, Fab. Ent. Syst. iii. 1. 54. 166.
Hab. Surinam.

9. P. pygmæa, Cram. pl. 7. f. A, B.
P. *Talus*, Fab. Ent. Syst. iii. 1. 318. 202.
Hab. Surinam.
Nothing can be made of Cramer's figure. Fab. describes the underside as the upper, and *vice versâ*.

10. P. **Constantius**, Fab. Ent. Syst. iii. 1. 152. 468.
Hab. ?

11. P. **Arius**, Cram. pl. 31. f. E.
Hab. Surinam.

12. P. **Plautus**, Fab. E. S. iii. 1. 291. 113.
Hab. "Indiis."
Doubtful if belonging to this family.

13. P. **Bibulus**, Fab. Ent. Syst. iii. 1. 307. 163; Don. Ins. Ind. pl. 46. f. 1.
Hab. "Indiis."

14. P. **Cornelius**, Fab. Ent. Syst. iii. 1. 220. 689.
Hab. ?
Probably a *Satyride.*

15. P. **Argenissa**, Stoll, Cram. Suppl. pl. 27. f. 4, 4 *c.*
Hab. "Caffraria."

16. P. **Thasus**, Cram. pl. 333. f. I.
Hab. Surinam.
Possibly a bad figure of *Charis Trochilia*, ♀.

The following species, formerly considered Erycinidæ, have been ascertained to belong to other families:—

P. Theanus, Cram. pl. 139. f. F, a Lycænide.
P. Procas, Fab., a Hesperide.
P. Ægon, Fab., a *Melitæa.*

ADDENDA.

14–15. **Symmachia juratrix**, Westw. D. W. & H. Gen. D. L. p. 445.
Hab. Pará.

Aricoris Butleri.

♂. 1″ 7‴. Similar to *A. Pythia* (Hewits.) and *A. pythioides* (Butler); differs from the latter chiefly in the absence of the orange spot from the hind wing, beneath. Above blue-black; fore wing with an elongate light-blue spot near the base, traversed by the submedian nervure, and a rounded blue-white spot in the middle, crossed by the second median branch. Hind wing with three narrow light-blue streaks, the innermost reaching to the base. Beneath white, nervures broadly dusky.

♀. 1″ 7‴. Dark brown. Fore wing crossed by an orange belt; hind wing with a large white central spot. Beneath the same, but paler; hind wing with a marginal row of triangular white spots, and the nervures pale.

Hab. Tapajos.

Descriptions of fifty New Species of the Genus *Stigmodera*. By EDWARD SAUNDERS, Esq. Communicated by W. W. Saunders, Esq., V.P.L.S.

(With two Plates.)

[Read November 7, 1867.]

THE present paper contains characters and figures of fifty undescribed species of the genus *Stigmodera* from Australia. There still, however, remain a large number of apparently new species requiring description and further study; for, since there is great modification to be observed, both in the form and colouring of many of the species, it is very desirable to obtain long series of those which are closely allied before giving their specific characters.

In the species I now bring forward, I have had this in view, and have described only those which I think will not prove to be varieties of each other, leaving the more doubtful ones till further evidence shall prove the specific value of their characters.

All the species described in this paper are in my own collection.

STIGMODERA MNIZECHII. (Plate IX. fig 1.)

Viridi-nigrescens, thorace nitidissimo; elytris rugulosis, fascia prope apicem sanguinea; subtus nitida.

Dark greenish black. Elytra with a transverse sanguineous band near the apex. Antennæ purple.

Head deeply punctured, with an impressed line between the eyes, covered with short whitish hairs. Thorax, once and two-thirds as broad as long; anterior margin produced, half as long as the base; sides slightly rounded; base with a shallow median lobe; surface shining and smooth, sides largely punctured near the lateral margins, disk with a faintly impressed dorsal line, median basal lobe terminated on each side by a short longitudinal slit. Elytra once and two-thirds as long as wide, sides slightly sinuate above the middle; apex of each elytron somewhat diagonally truncate, outer angle of truncature slightly dentate; disk striate and very largely punctured; as they approach the sides the punctures become confluent, so as to give a rugose appearance, especially on the shoulders. Beneath of thorax, breast, first abdominal segment and legs, punctured, and slightly hairy. The rest of the segments polished, with a slight impression on each of their sides.

Length 15 lines, breadth 7.

Hab. N. W. Australia.

STIGMODERA BONVOULOIRII. (Plate IX. fig. 2.)

Capite thoraceque cyaneis fortiter punctatis et rugulosis, elytris sanguineis duabus maculis cyaneis notatis, subtus cyanea.

Head and thorax black, with cyaneous reflections. Elytra dark red, with just the base, a transverse somewhat semilunar spot starting from the scutellum, its under margin being semicircular, and another larger transverse diamond-shaped spot, midway between it and the apex, cyaneous. Beneath legs and antennæ cyaneous black.

Head deeply punctured. Thorax once and three-quarters as broad as long; anterior margin produced in the centre and at its angles, a little more than half as long as the base; sides rounded, their margins elevated, base with a wide central lobe; disk largely punctured, the punctures larger and closer together on the sides, with a slight dorsal line; basal lobe terminated on each side by a deep small pit. Elytra twice as long as wide, punctured and deeply striate, the striæ becoming irregular on the sides, and the interstices rugose; sides slightly sinuate above the middle; apex largely truncate. Beneath and legs largely punctured, with a few scattered hairs.

Length 16 lines, breadth 5½.

Hab. N. Australia.

STIGMODERA SANGUINEOCINCTA. (Plate IX. fig. 3.)

Capite thoraceque aureo-viridibus; elytris punctato-striatis, flavis, lateribus sanguineis; subtus viridis.

Head and thorax brassy-green. Elytra testaceous, with their lateral margins and apex sanguineous. Beneath and antennæ green.

Head punctured, widely channelled between the eyes, covered with short white hairs. Thorax nearly twice as broad as long; anterior margin slightly elevated, bisinuate, half as long as the base; sides rounded above the middle, thence subparallel to the base, which has a well-defined but shallow lobe; posterior angles acute; surface largely and deeply punctured; disk with a smooth slightly raised dorsal line, and two transverse irregular smooth spaces about one-third of the entire length of the thorax from the anterior margin; these neither touch the sides nor the dorsal line. Elytra nearly twice as long as wide, rather wider than the thorax, punctate striate, sides gradually converging to the apex, which is but slightly pointed. Beneath and legs finely punctured, covered with white hairs.

Length 12 lines, breadth 4½.

Hab. N. Australia.

STIGMODERA AFFINIS. (Plate IX. fig. 4.)

Limbata, C. G. nec Donov.

Capite thoraceque æreo-viridibus; thoracis marginibus sanguineis; elytris punctato-striatis, flavis, sutura late viridi, marginibus sanguineis; subtus viridis.

This species, so closely allied in general appearance to *Limbata* of Donovan, may be distinguished in the following manner:—

The colour of the head and thorax are bronzy-green, instead of brassy-green, as described and figured by him. The thorax is longer and much narrower, the elytra more parallel as to their sides; the punctuation of the thorax is larger and deeper. Beneath, less hairy, the hairs shorter. The two apical segments spotted with red on the sides.

Length 12–14 lines, breadth $4\frac{1}{2}$–$5\frac{1}{2}$.

Hab. New S. Wales.

STIGMODERA LOBICOLLIS. (Plate IX. fig. 5.)

Capite et thorace viridibus, hujus lateribus croceis; elytris ochraceis, striatis, apice utrinque fortiter bispinoso.

Head and thorax green, the latter with its lateral margins ochreous red. Elytra ochreous red. Beneath, legs, and antennæ green.

Head punctured, covered with short hairs, shallowly furrowed between the eyes. Thorax once and one-third as broad as long at the base; anterior margin slightly elevated, produced at the angles and in the middle; half as long as the base; sides diverging rapidly till about their middle, then subparallel to the base, which is very largely and deeply lobed; surface deeply punctured. Elytra nearly twice as long as wide, simply striate, finely punctured, interval between the sixth and seventh striæ somewhat rugose, striæ between this and the margin punctate; sides swelling out behind the middle; apex of each bispinose. Beneath and legs deeply and closely punctured, covered with short white hairs; two apical segments each with an ochreous spot on each margin.

Length 14 lines, breadth 5.

Hab. Australia.

STIGMODERA JANSONII. (Plate IX. fig. 6.)

Capite et thorace aureo-viridibus, hujus lateribus flavis; elytris punctato-striatis, flavis, sutura prope apicem viridi, apice utrinque bispinoso.

Head and thorax brassy-green; lateral margins of latter testaceous, scutellum green. Elytra testaceous, with their base itself, apex, and the suture for about half their entire length, green. Beneath, legs, and antennæ brassy-green.

Head deeply punctured, covered with short hairs, depressed between the eyes, with a slightly impressed dorsal line. Thorax once and three-quarters as broad as long; anterior margin slightly produced, half as long as the base; sides diverging rapidly till about the middle, then subparallel to the base, giving them a somewhat angulose appearance; base with a wide median lobe; surface deeply punctured, with a slightly impressed dorsal line, whose region is also depressed as it approaches the base. Elytra regularly punctate-striate, twice as long as wide; sides slightly sinuate above the middle; apex of each bispinose. Beneath and legs deeply punctured, hairy.

Length 16 lines, breadth 5.

Hab. Australia.

STIGMODERA SIMILIS. (Plate IX. fig. 7.)

Capite et thorace viridibus, punctatis; elytris testaceis, apice et sutura viridibus; subtus viridis.

Head and thorax greenish blue. Elytra testaceous, with the apex of the same colour as the thorax, which colour extends along the suture for three-quarters of its length, and along the sides for about the same distance. Beneath and antennæ green; sides of abdomen flavous.

Head punctured, covered with white hairs, with a deeply cut dorsal line, Thorax once and two-thirds as broad as long; anterior margin slightly elevated, produced, half as long as base; sides rounded, the widest part of thorax being behind the middle; posterior angles produced and acute; base nearly straight; disk very finely punctured, with an impressed dorsal line, the punctures on the sides much larger and deeper. Elytra once and three-quarters as long as wide; sides slightly sinuate above the middle; apex rounded; disk very shallowly striate, the sides more deeply with the striæ punctate. Beneath and legs finely punctured, covered with scattered white hairs.

Length 16 lines, breadth 6½.

Hab. Queensland.

STIGMODERA BIFASCIATA. (Piate IX. fig. 8.)

Capite thoraceque cupreis, hujus lateribus flavis, præsertim prope angulos posteriores; elytris flavis, duabus fasciis cyaneis ornatis; subtus flava, pedibus viridibus.

Head and thorax coppery, the latter with its lateral margins yellow, which colour spreads on the disk as they approach the base, leaving a small coppery spot just within its limits. Elytra flavous, with two narrow cyaneous bands placed rather close together, one just above the other below the middle, neither of them attaining the lateral margin. Beneath flavous; legs and antennæ green.

Head deeply punctured, with an impressed line between the eyes. Thorax once and three-quarters as long as broad; anterior margin slightly elevated and emarginate, half as long as the base; sides diverging in slightly curved lines till just behind the middle, then somewhat rapidly converging to the posterior angles, which are acute; base nearly straight; surface closely and deeply punctured, with an appearance of a faintly raised dorsal line. Elytra once and two-thirds as long as wide, punctate-striate; sides slightly sinuate above the middle; apex largely rounded. Beneath and legs finely punctured.

Length 8½ lines, breadth 4.

Hab. Swan River.

STIGMODERA PASCOEI. (Plate IX. fig 9.)

Capite thoraceque igneo-cupreis, punctatis, hujus lateribus prope angulos posteriores flavis; elytris flavis, postice cupreis; subtus flava, cupreo ornata.

Head and thorax coppery red, the latter with its lateral margins testaceous. Elytra testaceous, with just the base and the apex for not quite half their entire length of the same colour as the head and thorax. Beneath testaceous, with the centre of the thorax, breast, and the posterior margin of each abdominal segment, antennæ, and femora coppery-red. Tibiæ and tarsi green.

Head punctured with an impressed dorsal line. Thorax once and four-fifths as broad as long: anterior margin produced, a little more than half as long as the base; sides rounded; posterior angles produced and acute; base bisinuate; surface largely but shallowly punctured, with a smooth dorsal line. Elytra nearly twice as long as wide, striate, the interstices shallowly punctured; sides sinuate above the middle; apex of each somewhat obliquely truncate. Beneath and legs punctured, with a few scattered hairs.

Length 15 lines, breadth 6½.

Hab. Australia.

STIGMODERA WESTWOODII. (Plate IX. fig. 10.)

Capite viridi, duabus maculis testaceis notato; thorace cyaneo, punctato, lateribus late rubris; elytris rubris, fascia lata post medium apiceque cyaneis; subtus ferruginea.

Head bluish-green, with two small red spots between the eyes. Thorax cyaneous, with the margins widely sanguineous. Elytra dark reddish-yellow, with a wide transverse cyaneous band behind the middle; the apex is also of the same colour. Beneath and legs fulvous, with the posterior margin of each abdominal segment, antennæ, and knees cyaneous; exterior face of tibiæ green.

Head deeply punctured, slightly hairy in front, with a faint dorsal line. Thorax once and three-quarters as broad as long; anterior margin slightly produced in the centre and at the angles; sides much rounded, base nearly straight; disk deeply punctured, with a slight smooth dorsal line; anterior margin with an impressed line running parallel to it. Elytra nearly twice as long as wide, punctate-striate, sides nearly straight, apex largely rounded. Beneath and legs punctured, with a few scattered hairs.

Length 17 lines, breadth 7.

Hab. N. Australia.

STIGMODERA THORACICA. (Plate IX. fig. 11.)

Rubra, capite, thoracis disco maculaque ad elytrorum apicem nigris; subtus cyanea, lateribus abdominis rubris.

Head black. Thorax and elytra sanguineous; the former with its centre, and the latter with a large square sutural spot at the apex, cyaneous black. Beneath, legs, and antennæ cyaneous; margins and apex of abdomen sanguineous.

Head punctured, hairy, with a longitudinal impression in front, which widens as it approaches the mouth. Thorax once and four-fifths as broad as long; anterior margin very slightly produced, not quite half as long as the base; sides diverging rapidly to about the middle, then a little rounded and subparallel to the base, which is bisinuate; surface punctured, especially on the sides; dorsal line slightly impressed; lateral margins elevated and somewhat reflexed. Elytra twice as long as wide, punctate-striate, sides subparallel to about the middle; apex of each with a short sutural spine. Beneath and legs punctured, covered with rather long grey pubescence.

Length 16 lines, breadth 6½.

Closely allied to *S. laticollis*, Thoms., from which it differs in the shape of the thorax, which is less convex, wider in front, the margins reflexed. Elytra more deeply striate, abdomen margined with red.

Hab. Australia.

STIGMODERA SANGUINIVENTRIS. (Plate IX. fig. 12.)

Capite et thorace æneis, punctatis, hujus lateribus rubris; elytris striatis, rubris, apicibus nigris; subtus pectore æneo, abdomine rubro.

Head and thorax bronzy, the latter with its lateral margins red. Elytra red, with just their base and apex bronzy. Beneath, sides of thorax, and the abdomen red; legs and breast and antennæ bronzy.

Head punctured, covered with very short hairs, with a slightly impressed dorsal line. Thorax twice as broad as long; anterior margin nearly straight, half as long as the base; sides diverging in straight lines till behind the middle, then slightly rounded and converging to the base, which is almost straight; surface deeply punctured, especially at the sides; disk with a smooth dorsal line. Elytra once and two-thirds as long as wide; sides sinuate just above the middle; apex truncate; disk finely punctured, striate, the striæ punctured on the sides. Beneath and legs punctured, hairy.

Length 12 lines, breadth 5½.

Hab. Australia.

STIGMODERA SEXMACULATA. (Plate IX. fig. 13.)

Nigra; thorace macula utrinque elytrisque maculis quatuor rubris; subtus cyanea, lateribus abdominis rubro maculatis.

Black; thorax with a red spot on each margin, commencing at the anterior angle, but not quite touching the base, extending for about a quarter of the entire width of the thorax towards the disk. Elytra each with a large red spot above the middle, which is deeply sinuate on its upper margin and rounded on its inferior, and a smaller one of the same colour midway between the centre of the elytra and the apex; both of these touch the lateral margins, but not quite the suture. Beneath and antennæ cyaneous blue; sides of thorax and abdomen spotted with red.

Head punctured, covered with short hairs. Thorax twice as broad as long; anterior margin slightly produced, ciliate, not quite half as long as the base; sides rounded; base bisinuate. Elytra twice and one-half as long as wide, punctured, striate; apex of each obtusely bidentate. Beneath and legs punctured, with a few scattered hairs.

Length 17 lines, breadth 7.

Hab. Australia.

STIGMODERA LÆVICOLLIS. (Plate IX. fig 14.)

Capite et thorace viridibus, hujus lateribus flavis; elytris flavis, striatis, fasciis tribus apiceque nigris; abdomine flavo, viridi cingulato.

Head and thorax green, the latter with its lateral margins testaceous. Elytra yellow, with three transverse bands and the apex black, the first very wide and situated just below the base; all the bands are united on the sides, but not on the suture. Beneath flavous; legs, a triangular spot on the breast, and the posterior margin of each abdominal segment and antennæ green.

Head punctured, with a slight dorsal line, raised on the vertex, and a faintly impressed round fovea between the eyes. Thorax once and two-thirds as broad as long; anterior margin produced, half as wide as the base; sides rounded; base slightly lobed; surface smooth, punctured on the sides. Elytra once and three-fourths as long as wide, punctate-striate, the interstices also punctured; sides sinuate above the middle; apex rounded. Beneath and legs very finely punctured.

Length 15½ lines, breadth 6.

Hab. Australia.

STIGMODERA PUNCTATO-STRIATA. (Plate IX. fig. 15.)

Capite et thorace viridibus; elytris fortiter punctato-striatis, latericeis, maculis tribus utrinque nigris; subtus pedesque virides.

Head and thorax green. Elytra croceous, each with three black spots, one small one, on the shoulders, a larger irregularly shaped one about the middle, and a transverse oval one between it and the apex, which is also margined with the same colour. Beneath, legs, and antennæ green; sides of abdomen spotted with yellow.

Head punctured, depressed between the eyes, and furrowed on the vertex. Thorax once and three-quarters as wide as long; anterior margin nearly straight, a little more than half as long as the base; sides slightly rounded; posterior angles acute; base with a shallow lobe; disk slightly punctured, with a faint dorsal line, met at the base by a few punctures; punctures on the sides much deeper, especially near the posterior angles, which are slightly depressed; a deeply impressed line runs parallel to the anterior margin, so as to give it a raised appearance. Elytra twice as long as wide, very deeply and largely punctate-striate; sides sinuate above the middle; apex rounded. Beneath and legs deeply punctured, punctuation of the centre of abdomen much finer.

Length 10½ lines, breadth 4.

Hab. Swan River.

STIGMODERA CURTA. (Plate IX. fig. 16.)

Capite et thorace æneis, hujus lateribus flavis; elytris punctato-striatis, flavis, sutura, fasciis duabus post medium et duabus vittis humeralibus cyaneis; subtus aureoviridis.

Head and thorax dull bronzy; sides of the latter narrowly bordered with yellow. Elytra yellow, with the suture, a band below the middle, which reaches the sides, and a short curved band midway between it and the apex cyaneous; from each shoulder is a vitta of the same colour extending for about a third of the entire length of the elytra. Beneath and antennæ green.

Head largely and deeply punctured, channelled between the eyes. Thorax once and three-quarters as wide as long; anterior margin nearly straight, half as long as the base; sides rounded; base slightly sinuate. Elytra once and two-thirds as long as wide, rather wider than the thorax at their shoulders, widest behind the middle, punctate-striate; sides sinuate below the shoulders; apex truncate, with an external tooth on each elytron. Beneath punctured, covered with short grey hairs.

Length 5 lines, breadth 2.

Hab. Australia.

STIGMODERA ABDOMINALIS. (Plate IX. fig. 17.)

Capite et thorace viridibus; elytris sutura, fascia infra medium maculaque prope apicem viridibus, inter basin fasciamque mediam macula oblonga ejusdem coloris; subtus viridis, abdomine testaceo.

Head and thorax bronzy-green. Elytra croceous yellow, with the suture, an angulated band below the middle, and a spot between it and the apex green; the colour of the suture widens out at the base so as to extend about two-thirds across each elytron; there is a vitta of the same colour above the median band between the suture and side, leaving an equal margin of the ground-colour all round it. Beneath, legs, and antennæ bronzy. Abdomen rufous.

Head punctured, deeply excavated between the eyes. Thorax widest just behind the middle, once and three-quarters as broad as long; anterior margin elevated, half as long as the base; sides diverging in almost straight lines till just past the middle, then slightly rounded to posterior angles; base faintly lobed; surface punctured, especially at the sides; dorsal line indicated by a small longitudinal slit at the base. Elytra not quite twice as long as wide, punctate-striate, the interstices also punctured; sides slightly sinuate above the middle; apex simply pointed. Beneath and legs punctured, covered with short fine decumbent white hairs.

Length 6 lines, breadth $2\frac{1}{2}$.

Hab. Australia.

STIGMODERA JEKELLII. (Plate IX. fig. 18.)

Capite et thorace æneis; elytris rubris, sutura, fascia post medium maculaque inter illam apicemque cyaneis, macula humerali oblonga utrinque ejusdem coloris.

Head and thorax bronzy. Elytra dull red, with the suture, a narrow band below the middle touching the lateral margins, a short one between it and the apex, curved in the arc of a circle, and the apex itself green; there are also two short vittæ extending from the shoulders for about two-fifths of the entire length of the elytra, of the same colour. Beneath, legs and antennæ green; body rufous.

Head punctured, widely channelled between the eyes. Thorax widest about one-third of its length from the base; once and two-thirds as broad as long at the base; anterior margin nearly straight, half as long as the base; sides diverging in nearly straight lines for two-thirds of their length, then suddenly converging to the base, which has a very shallow lobe; surface punctured; punctures very deep on the sides; dorsal line fine and raised. Elytra punctate-striate, almost twice as long as broad, wider than the thorax at the base, the exterior angles of which are very prominent; sides sinuate above the middle; apex of each finely emarginate. Beneath and legs punctured, covered with short white hairs.

Length 9 lines, breadth 4.

Hab. Adelaide.

STIGMODERA SEMISUTURALIS. (Plate IX. fig. 19.)

Capite et thorace punctatis, æneis; elytris sanguineis, sutura ad basin viridi; subtus ænea, corpore rubro.

Head and thorax bronzy. Elytra sanguineous, with the suture for about half its length bronzy. Beneath, legs, and antennæ bronzy; abdomen rufous.

Head punctured, deeply channelled between the eyes. Thorax once and two-thirds as broad as long; anterior margin elevated and produced, half as long as the base; sides diverging in very slightly curved lines for three-quarters of their length, then converging to the posterior angles; base shallowly lobed; surface deeply punctured; disk with a fine smooth dorsal line: near the posterior angle on each side is a slightly impressed round fovea; this character, however, is so faint that it may not be worth much. Elytra twice as long as wide; punctate-striate; sides sinuate above the middle; apex of each finely emarginate. Beneath and legs punctured, covered with short white hairs.

Length 10 lines, breadth 4.

Hab. Australia.

STIGMODERA CYANIPES. (Plate IX. fig. 20.)

Capite et thorace nigris, hujus lateribus late ferrugineis; elytris nigris, fasciis duabus utrinque ferrugineis; subtus nigra, lateribus abdominis rubris, pedibus cyaneis.

Head and thorax bronzy black, the margins of the latter ferruginous, the colour widening as it approaches the base; elytra black, with a cyaneous tinge, with a wide transverse band on each, starting from just behind the shoulder, but not reaching the suture, its lower margin being about two-thirds of the entire length of the elytra from the base; in the specimen before me the yellow runs up in front of the shoulder and nearly touches the base; but this character is liable to great variation; there is also an oval transverse spot of the same colour midway between it and the apex. Beneath black; sides of the first three abdominal segments, and the whole of the last two, testaceous; legs and antennæ cyaneous.

Head deeply punctured, furrowed between the eyes. Thorax once and two-thirds as long as the base; anterior margin nearly straight, half as long as the base; sides diverging rapidly for two-thirds of their length, then converging to the base, thus forming a strongly marked angle on each; base straight; surface punctured with a very faint smooth dorsal line. Elytra punctate-striate, once and two-thirds as long as wide; sides slightly sinuate above the middle; apex of each obliquely truncate. Beneath and legs punctured, with a few scattered hairs.

Length 8–9 lines, breadth 3–3½.

Hab. Adelaide.

Stigmodera marginicollis. (Plate X. fig. 21.)

Capite et thorace cyaneo-nigris, hujus lateribus flavis; elytris nigris, duabus fasciis angustis utrinque flavis; subtus sanguinea, femoribus cyaneis.

Head brassy-green. Thorax and elytra cyaneous black, the former with its lateral margins, the latter with two bands on each, not reaching the suture, ochraceous, one of these being placed just above the middle, the other nearly midway between it and the apex. Beneath and femora fulvous; the tips of latter, the tibiæ, tarsi, and antennæ cyaneous green.

Head largely and deeply punctured, excavated between the eyes. Thorax not quite twice as broad as long at the base; anterior margin slightly emarginate, half as long as the base; sides diverging rapidly for two-thirds of their length, thence converging to posterior angles; base slightly sinuate; disk convex, punctured with a faint dorsal line, the punctuation of the sides rather deeper, which each bear a slight elongate fovea which runs parallel to the lateral margin just above the posterior angle. Elytra punctate-striate, a little more than once and a half as long as wide, base slightly narrower than the thorax, widening considerably at the shoulders, sinuate below them, and swelling out again behind the middle; apex of each bidentate. Beneath and legs punctured, covered with short white hairs.

Length 10 lines, breadth 4.

Hab. New S. Wales.

STIGMODERA GIBBICOLLIS. (Plate X. fig. 22.)

Capite thoraceque punctatis, nigris, hujus lateribus late ferrugineis; elytris cyaneis, fasciis duabus latis utrinque testaceis; subtus punctata, cyanea, pubescens.

Head and thorax black, the former with the mouth cyaneous, the latter with its lateral margins rufous. Elytra cyaneous, with a wide triangular ferruginous spot on each, just above the middle, touching the lateral margin, the apices of the triangles almost meeting on the suture; between this and the apex is a slightly curved band on each, not quite touching the suture. Beneath, legs, and antennæ cyaneous.

Head punctured, with a deep channel between the eyes. Thorax at the base once and two-thirds as broad as long; anterior margin slightly elevated and emarginate, half as long as the base; sides diverging in rather curved lines till within about a third of their length from the base, then rounded and converging to the posterior angles; base slightly sinuate; disk convex, punctured, with a smooth dorsal line. Elytra punctate-striate, twice as long as wide; sides sinuate below the shoulders; apex of each terminating in a sharp point. Beneath and legs punctured, covered with white hairs.

Length 5 lines, breadth 2.

Hab. Adelaide.

STIGMODERA CUPRICOLLIS. (Plate X. fig. 23.)

Capite et thorace cupreis, punctatis; elytris striatis, nigris, tribus fasciis utrinque flavis; subtus cuprea, punctata.

Head and thorax cupreous, disk of latter purplish. Elytra black, each with a short flavous band extending from the shoulder to about a quarter of the entire breadth of the elytron from the suture, and two others of the same colour, one placed just above the middle, the other, which is rather wider, between it and the apex; neither of these quite touch the suture. Beneath, legs, and antennæ coppery; tarsi aureous.

Head deeply punctured, channelled between the eyes. Thorax at the base once and three-quarters as wide as long; anterior margin elevated, nearly straight, half as long as the base; sides diverging in straight lines for two thirds of their length, then subparallel to the base, which is almost straight; surface punctured, the punctures on the sides, especially near the posterior angles, larger and deeper; disk with a faint smooth dorsal line terminating at its base in a deep puncture. Elytra punctate-striate, once and two-thirds as long as wide; sides swelling out slightly behind the middle, apex of each minutely bidentate. Beneath and legs punctured, covered with a short silky white pubescence.

Length 9 lines, breadth 3½.

Hab. Australia.

STIGMODERA COSTATA. (Plate X. fig. 24.)

Capite et thorace æneis, punctatis; elytris striatis, flavis, interstitiis elevatis, sutura fasciisque duabus post medium cyaneis, maculaque utrinque humerali oblonga ejusdem coloris.

Head and thorax bronzy. Elytra testaceous, with the suture, a band crossing it just below the middle, nearly touching the lateral margins, a short semilunar spot between it and the apex, and the apex itself cyaneous; above the band, between the suture and the lateral margin, on each, is an oblong spot of the same colour. Beneath and legs and antennæ bronzy.

Head punctured, channelled between the eyes. Thorax once and two-thirds as wide as long; anterior margin slightly elevated and rounded, a little more than half as long as the base; sides gradually rounded: base with a shallow triangular lobe; surface punctured, punctuation of the sides denser; disk with a slightly impressed dorsal line; near each posterior angle is a small round depression. Elytra punctate-striate, the third, fifth, and ninth interstices much raised and rounded; sides sinuate above the middle, apex of each bidentate, the outer tooth being produced almost into a short spine. Beneath and legs punctured, covered with a cinereous pubescence.

Length 6½ lines, breadth 2½.

Hab. New S. Wales.

STIGMODERA PICTIPENNIS. (Plate X. fig. 25.)

Capite thoraceque viridibus; elytris flavis, sutura, marginibus lateralibus fasciisque duabus cyaneis, maculaque humerali ejusdem coloris; subtus flava, viridi ornata.

Head and thorax green. Elytra testaceous, with the base, suture, and lateral margin from a third of its entire length from the base cæruleous; a vitta of the same colour originates at the base, and joins the lateral margin where the latter becomes cæruleous, so as to leave the margin between the point of juncture and the base testaceous; there is a band of the same colour behind the middle, slightly bent downwards from the suture to the lateral margin, and a similar shorter one between it and the apex. Beneath testaceous; sides of breast, a triangular spot on the same, a semilunar one on the first abdominal segment, and the posterior margins of the rest green; there is also a small green spot on the first three, near the lateral margin; legs and antennæ green.

Head deeply punctured, furrowed between the eyes. Thorax once and two-thirds as wide as long; anterior margin produced in the centre, two-thirds as long as the base; sides much rounded just behind the anterior angles, then subparallel to the base, which is nearly straight; surface very closely punctured, with an irregular smooth dorsal line. Elytra twice as long as wide, deeply and rugosely punctate-striate; sides subparallel for two-thirds of their length, slightly reflexed; apex of each terminating in a sharp exterior tooth. Beneath and legs punctured, covered with scattered white hairs.

Length 6 lines, breadth 2½.
Hab. Swan River.

STIGMODERA RECTIFASCIATA. (Plate X. fig. 26.)

Capite et thorace æneobrunneis, nitentibus; elytris flavis, punctato-striatis, tribus fasciis nigris; subtus ænea, albo pubescens.

Head and thorax bronzy-brown. Elytra flavous, with a narrow straight band below the base, a wider one behind the middle, and the apex for two-fifths of their entire length black; the colour of the postmedian band unites with that of the apex on the suture. Beneath bronzy, with purple reflections; legs and antennæ cyaneous.

Head punctured, channelled between the eyes. Thorax at the base once and a half as broad as long; anterior margin produced in the centre, half as long as base; sides rounded, base with a very shallow lobe; surface very shining, remotely punctured; dorsal line indicated by a deep puncture at the base and a longitudinal impression near the anterior margin; close to each posterior angle is a small transverse fovea. Elytra once and three-quarters as long as wide, punctate-striate, the third, fifth, seventh, and ninth interstices raised and rounded. Sides sinuate above the middle; apex of each with a sharp external spine.

Beneath and legs punctured, covered with an adpressed grey pubescence.

Length 6½ lines, breadth 2½.
Hab. Australia.

STIGMODERA OCTOMACULATA, *Reiche* (MS.). (Plate X. fig. 27.)

Capite et thorace æneis; elytris ferrugineis, octo maculis rotundis æneis ornatis; subtus ænea, punctata.

Head and thorax bronzy. Elytra ferruginous, with eight subrotund bronzy spots, two of which are on the suture, the other six are arranged three on each lateral margin, one being on the shoulder, the second placed rather diagonally about the middle, and the third midway between it and the apex. Beneath, legs, and antennæ bronzy.

Head punctured, widely channelled between the eyes. Thorax once and a half as broad as long at the base; anterior margin slightly elevated, nearly straight, a little more than half as long as the base; sides rounded above the middle, then nearly straight to the posterior angles, which are almost right angles; base straight; surface punctured, especially on the sides; disk with an impressed dorsal line. Elytra once and three-quarters as long as wide, punctate-striate; sides subparallel above the middle; apex of each with a small obsolete tooth. Beneath and legs punctured, covered with a short grey pubescence.

Length 5½ lines, breadth 2.
Hab. Adelaide.

STIGMODERA ÆNEICORNIS. (Plate X. fig. 28.)

Capite thoraceque cyaneis; elytris punctato-striatis, ferrugineis, sutura fasciaque brevi post medium maculaque apicali ejusdem coloris; subtus cyanea, antennis æneis.

Head and thorax cæruleous, the latter with the disk obscure. Elytra croceous, suture cyaneous, spreading into a small diamond-shaped spot just below the base, a much wider lunulate one below the middle, and a triangular one just above the apex. Beneath and legs cyaneous; antennæ brassy-green.

Head deeply punctured, furrowed between the eyes. Thorax once and a half as wide as long, anterior margin nearly straight and slightly elevated, sides rounded, base straight; surface punctured, especially on the sides. Elytra at the shoulders much wider than the thorax, largely punctate-striate; sides sinuate below the shoulders; apex of each with a small external tooth; beneath and legs punctured, with a few scattered white hairs.

Length 5 lines, breadth 2.

Hab. New S. Wales.

STIGMODERA CRUX. (Plate X. fig. 29.)

Capite thoraceque punctatis, æneis; elytris flavis, sutura fasciaque post medium cyaneis, maculaque humerali ejusdem coloris; subtus ænea.

Head and thorax bronzy. Elytra flavous, with the suture and a band crossing it behind the middle cæruleous, thus forming an inverted cross; the colour of the suture widens slightly below the base, and considerably (so as to form a small triangle) near the apex; between the suture and lateral margin, just below the shoulder, is an oval spot of the same colour. Beneath bronzy; legs and antennæ cyaneous.

Head punctured, deeply furrowed between the eyes. Thorax at its base once and two-thirds as broad as long; anterior margin slightly emarginate and raised, half as long as the base; sides rounded behind the middle; base bisinuate; surface punctured; disk convex, with a slightly impressed dorsal line. Elytra finely punctate-striate, nearly twice as long as wide; shoulders rather prominent; sides sinuate above the middle; apex of each subdentate. Beneath and legs punctured, covered with a rather long grey pubescence.

Length 5 lines, breadth 2.

Hab. Australia.

STIGMODERA DISTINCTA. (Plate X. fig. 30.)

Capite et thorace æneis; elytris flavis, punctato-striatis, fascia post medium apicibusque nigris; subtus ænea, pubescens.

Head and thorax bronzy. Elytra testaceous, with a narrow nearly straight band behind the middle, and their apex black. Beneath, legs, and antennæ cyaneous.

Head deeply punctured, impressed between the eyes. Thorax at its base twice as wide as long; anterior margin elevated and emarginate, half as long as the base; sides slightly rounded; base bisinuate surface largely and somewhat remotely punctured; just above the scutellum is a larger round puncture. Scutellum large, cordiform. Elytra punctate-striate, once and two-thirds as long as wide; shoulders rather prominent; sides sinuate above the middle; apex of each widely truncate, with a short external spine. Beneath and legs punctured, covered with short white hairs.

Length 5 lines, breadth 2.

Hab. Australia.

STIGMODERA PILIVENTRIS. (Plate X. fig. 31.)

Capite thoraceque fortiter punctatis, æneis; elytris rubris, macula suturali post basin, fascia media maculaque apicali cyaneis; subtus cyanea, dense albo pubescens.

Head and thorax bronzy. Elytra red, with a triangular spot on the suture below the scutellum; a transverse post-median band, which is widest on the suture, and gradually narrowing to the lateral margins, and a somewhat square sutural spot reaching the apex, cyaneous. Beneath cyaneous, covered very densely with rather long white hairs; legs and antennæ cyaneous.

Head deeply punctured, channelled between the eyes. Thorax at its base once and three-quarters as wide as long; anterior margin slightly raised and emarginate; sides rounded; base bisinuate; surface deeply punctured, especially on the sides; disk very convex, with a slightly impressed dorsal line met at the base by a large puncture. Elytra once and two-thirds as long as wide, punctate-striate, the interstices slightly raised, and deeply punctured, especially on the sides; sides sinuate below the shoulders; apex of each finely emarginate, with a sharp external tooth. Beneath and legs punctured, densely pubescent.

Length 5½ lines, breadth 2.

Hab. Queensland.

STIGMODERA CARMINEA, *H. Deyr.* (MS.). (Plate X. fig. 32.)

Capite thoraceque æneis; elytris sanguineis, tribus fasciis cyaneis; subtus cyanea, albo pubescens.

Head and thorax bronzy. Elytra deep red, with two wide transverse bands, one close to the base touching it at the scutellum, and the second near the middle, cyaneous; between this and the apex is a triangular sutural spot of the same colour. Beneath and legs and antennæ cyaneous.

Head punctured, deeply impressed between the eyes. Thorax once and three-quarters as broad as long; anterior margin emarginate, raised, half as long as the base; sides gradually rounded; base with a very shallow median lobe; surface deeply punctured, with a slightly raised dorsal line, met at the base by a large puncture. Elytra much wider than the thorax at the shoulders, once and three-quarters as long as wide, punctate-striate, the interstices also punctured; sides sinuate below the shoulders; apex of each finely emarginate. Beneath punctured, covered with short white hairs.

Length 6 lines, breadth 3.

Hab. New S. Wales.

STIGMODERA OBSCURIPENNIS. (Plate X. fig. 33.)

Capite thoraceque viridibus, punctatis; elytris sordide rubris, tribus fasciis viridibus; subtus aureo-viridis.

Head and thorax green. Elytra brownish red, with three green transverse bands, one below the base produced on the suture, so as to touch the scutellum, the second behind the middle, the third between it and the apex, these latter two are united on the suture; the apical one does not reach the lateral margins, and is rounded on its lower side. Beneath and legs and antennæ golden green.

Head punctured, depressed between the eyes. Thorax once and three-quarters as wide as long; anterior margin slightly elevated, and produced in its centre, half as long as the base; sides rounded; posterior angles acute; base with a shallow median lobe; surface deeply and largely punctured; disk with a smooth slightly raised dorsal line. Elytra rugosely punctate-striate, twice as long as wide; sides sinuate below the shoulders; apex of each with a blunt tooth. Beneath and legs punctured, sparsely covered with long white hairs.

Length 6½ lines, breadth 2½.

Hab. Swan River.

STIGMODERA CUPRICAUDA. (Plate X. fig. 34.)

Capite thoraceque æneis; elytris flavis, punctato-striatis, fasciis duabus cupreo-brunneis, apice cupreo; subtus ænea, pubescens.

Head and thorax bronzy, with greenish reflections. Elytra testaceous, with two transverse bands coppery brown, the apex coppery; the upper of these becomes divaricated as it approaches the lateral margin, one branch extending on to the shoulder, the other touching the margin about a third of the length of the elytra from the base; the postmedian band is widest at the suture and slightly produced about the middle of its upper margin. Beneath and legs and antennæ bronzy.

Head deeply and largely punctured, impressed between the eyes. Thorax once and three-quarters as broad as long at the base; anterior margin elevated, nearly straight, not quite two-thirds as long as the base; sides rounded, posterior angles acute; base almost straight. Surface largely punctured, with a slightly impressed dorsal line. Elytra twice as long as wide, punctate-striate; sides sinuate below the shoulders; apex of each finely bidentate, external tooth longest. Beneath and legs punctured, densely covered with a long sericeous grey pubescence.

Length 6 lines, breadth 2.

Hab. New S. Wales.

STIGMODERA CYLINDRACEA. (Plate X. fig. 35.)

Capite thoraceque æneis, punctatis; elytris flavis, marginibus sanguineis, tribus fasciis nigris ornatis; subtus ænea.

Head and thorax coppery green, the latter rather darker on the disk. Elytra testaceous, with its lateral margins sanguineous, traversed by three black bands, the two upper ones narrow, the apical one being of a triangular form; of these the postmedian one alone reaches the lateral margins. Beneath and legs and antennæ golden green.

Head punctured, channelled between the eyes. Thorax subglobose, once and two-thirds as broad as long; anterior margin nearly straight and elevated, half as long as the base; sides much rounded; base with a very shallow lobe; disk very convex, punctured, with a slightly impressed dorsal line, punctation of the sides deeper. Elytra twice as long as wide, punctate-striate; sides subparallel for two-thirds of their length; apex of each with a slight point. Beneath and legs punctured, with a few scattered white hairs.

Length 6½ lines, breadth 2.

Hab. New S. Wales.

STIGMODERA WILSONI, *H. Deyr.* (MS.). (Plate X. fig. 36.)

Capite et thorace æneis, punctatis; elytris cupreo-brunneis, vitta longitudinali prope basin maculaque transversa ad apicem flavis; subtus ænea.

Head and thorax bronzy green. Elytra purple; each with a testaceous vitta, originating quite close to the base and extending not quite to their middle, it then turns at right angles to itself, touching the lateral margin; below this, midway between it and the apex, is a small crescent-shaped spot. Beneath of thorax and breast and antennæ cyaneous, abdomen olivaceous.

Head deeply punctured, channelled between the eyes. Thorax widest about the middle, at its base once and a half as broad as long; anterior margin elevated, nearly straight, two-thirds as long as the base; sides much rounded; base with a narrow median lobe; surface deeply punctured, disk with a slightly raised dorsal line, met at the base by a small round fovea. Elytra a little more than twice as long as wide, punctate-striate, the interstices slightly raised; sides subparallel for two-thirds of their length; apex of each emarginate and bidentate, the exterior tooth much the stronger. Beneath and legs punctured, covered with very short white hairs.

Length 5 lines, breadth 1½.

Hab. Australia.

STIGMODERA INCONSPICUA. (Plate X. fig. 37.)

Capite thoraceque nigris, punctatis; elytris punctato-striatis, flavis, tribus fasciis nigris ornatis; subtus ænea, dense pubescens.

Head and thorax bronzy black. Elytra testaceous, with the suture, two transverse bands, and the apex black; the band near the base widens and divides into two as it approaches the lateral margin. Beneath, legs, and antennæ bronzy.

Head closely punctured, shallowly furrowed between the eyes. Thorax once and two-thirds as broad as long at the base; anterior margin slightly emarginate and raised, two-thirds as long as the base; sides much rounded before the middle, then subparallel to the posterior angles; base with a shallow median lobe; surface closely punctured; disk with a faint dorsal line met at the base by a large puncture. Elytra once and three-quarters as long as wide; punctate-striate; sides sinuate above the middle; apex of each very finely emarginate. Beneath and legs punctured, covered with silky white hairs.

Length 6 lines, breadth 2½.

Hab. Australia.

STIGMODERA THOMSONI. (Plate X. fig. 38.)

Capite thoraceque cyaneo-nigris, punctatis; elytris punctato-striatis, sanguineis, tribus fasciis viridibus; subtus viridis.

Head and thorax bronzy black. Elytra sanguineous, with a transverse band below the base, touching the scutellum in its middle, but not reaching the lateral margins, a wide postmedian band and the apex olivaceous green. Beneath, legs, and antennæ green.

Head punctured, with a deep excavation and incision between the eyes. Thorax twice as broad as long at the base; anterior margin nearly straight, and raised, half as long as the base; sides diverging in very slightly emarginate lines for two-thirds of their length, then subparallel to the posterior angles; base with a shallow median lobe; surface largely and deeply punctured, with a very faintly impressed dorsal line apparent chiefly at the base. Elytra twice as long as wide, striated; the interstices finely punctured; sides sinuate below the shoulders; apex of each finely truncate, with a small external tooth. Beneath and legs punctured, covered with long grey hairs.

Length 7 lines, breadth 3.

Hab. Australia.

STIGMODERA 4-FASCIATA. (Plate X. fig. 39.)

Capite thoraceque cupreis, hujus basi macula cyanea ornata; elytris punctato-striatis, flavis, quatuor fasciis transversis cyaneis; subtus cyanea.

Head and thorax cupreous, the former with the mouth cæruleous, the latter with a large cyaneous spot extending from the centre of the base and not quite touching the anterior margin. Elytra testaceous, with three transverse bands, and the apex cyaneous; the basal one contracts on the suture, and does not touch the lateral margin; the median band is wavy and touches it; the third is shorter and nearly straight. Beneath of thorax, breast, and legs and antennæ cyaneous; abdomen olivaceous.

Head punctured, with an impressed longitudinal line between the eyes.

Thorax once and two-thirds as broad as long; anterior margin nearly straight, somewhat elevated, half as long as the base; sides rounded; base almost straight; surface punctured, especially on the sides; disk with a very faint dorsal line, met at the base by a very small round fovea. Elytra twice and a quarter as long as wide, rugosely punctate-striate; the interstices also punctured; sides slightly sinuate above the middle; apex of each somewhat produced and bidentate; the outer tooth much the longer. Beneath and legs punctured; sides of thorax, breast, and abdomen covered with a white sericeous pubescence.

Length $5\frac{1}{2}$ lines, breadth $1\frac{1}{2}$.

Hab. Australia.

STIGMODERA VITTATA, *H. Deyr.* (MS.). (Plate X. fig. 40.)

Capite thoraceque æneo-viridibus; elytris punctato-striatis, nigris, marginibus lateralibus vittaque utrinque flavis; subtus brunnea, pubescens.

Head and thorax bronzy green. Elytra purplish black, with their lateral margins and a wide vitta on each extending almost from the base for five-sixths of the entire length of the elytra, and gradually becoming narrower as it approaches the apex, flavous. Beneath, legs, and antennæ cupreous brown. Head punctured, impressed between the eyes. Thorax at the base once a half as broad as long; anterior margin nearly straight and slightly elevated, two-thirds as long as the base; sides rounded; base straight.

Surface largely and deeply punctured; disk with an impressed dorsal line. Elytra twice and a quarter as long as wide; punctate-striate; sides subparallel for two-thirds of their length; apex of each with an external tooth. Beneath and legs punctured, covered with short white hairs.

Length 6 lines, breadth 2.

Hab. Adelaide.

STIGMODERA LUTEOCINCTA. (Plate X. fig. 41.)

Viridis, punctata; elytris punctatis, striatis, luteo cinctis, præsertim prope apicem; subtus aureo-viridis, abdomine ferrugineo.

Brassy green. Elytra entirely surrounded by a narrow testaceous belt, the colour spreading on the apex and extending across the elytra for about a third of their entire length from the apex; close to the apex is a small crescent-shaped spot of the same colour as the disk of the elytra. Beneath of thorax, breast, legs, and antennæ green; abdomen ferruginous.

Head largely punctured, channelled between the eyes. Thorax once and two-thirds as broad as long; anterior margin slightly produced and elevated, half as long as the base; sides diverging for two-thirds of their length, then slightly emarginate to the posterior angles; base almost straight; surface deeply punctured, with a smooth dorsal line. Elytra not quite twice as broad as long, punctate-striate, the interstices very finely punctured; sides sinuate above the middle; apex of each very finely emarginate. Beneath and legs punctured, covered with a short sericeous pubescence.

Length 7 lines, breadth $2\frac{1}{2}$.

Hab. Australia.

Stigmodera mimus. (Plate X. fig. 42.)

Capite cyaneo; thorace ferrugineo, macula nigra antice ornato; elytris olivaceis, fascia prope apicem testacea; subtus ferruginea, lateribus nigro maculatis; pedibus cyaneis.

Head greenish black. Thorax sanguineous, with a large black transverse spot extending along the anterior margin, but not quite touching it, and produced on its inferior margin in the centre so as to form a very much flattened T, black. Elytra olivaceous, with a band just above the apex, and the lateral margin from behind the shoulder to about its middle testaceous. Beneath croceous, with an oblong spot on each side of the breast, a crescent-shaped spot in its centre, two small lateral spots on each abdominal segment, and legs and antennæ cyaneous.

Head deeply punctured, longitudinally impressed between the eyes. Thorax once and three-quarters as wide as long; anterior margin slightly emarginate, half as long as the base; sides diverging in nearly straight lines to the middle, then rounded and converging to the posterior angles; base with a shallow median lobe; surface deeply punctured throughout, with a faint smooth dorsal line. Elytra a little more than once and three-quarters as long as wide, very densely punctured, the punctures becoming larger and denser on the sides; sides deeply sinuate above the middle; apices rounded. Beneath and legs punctured, sparsely covered with very short white hairs.

Length 7 lines, breadth 3.

Hab. Queensland.

Stigmodera subbifasciata. (Plate X. fig. 43.)

Purpurea, punctata; elytris punctato-striatis, duabus fasciis flavis utrinque; subtus punctata, purpurea.

Above purple. Elytra with two transverse flavous bands, one situated below the base, the other about a third of the entire length of the elytra from the apex; this latter is interrupted on the suture. Beneath, legs, and antennæ purple. Head punctured with an impressed line between the eyes. Thorax once and a half as broad as long. Anterior margin nearly straight, two-thirds as long as the base; sides rounded; base bisinuate; surface punctured; disk withan impressed dorsal line. Elytra twice as long as wide, punctate-striate, the third, fifth, seventh, and ninth interstices raised; sides slightly sinuate below the shoulders; apex of each very finely emarginate and bidentate.

Beneath and legs punctured, with scattered white hairs.
Length 5½ lines, breadth 1½.
Hab. Australia.

STIGMODERA AMPLIPENNIS. (Plate X. fig. 44.)

Capite thoraceque nigris, punctatis; elytris punctatis, striatis, ferrugineis, apice nigro; subtus cyanea.

Head and thorax black. Elytra croceous, with the suture and apex black. Beneath, legs, and antennæ cyaneous black.

Head finely punctured, deeply channelled between the eyes. Thorax once and three-quarters as broad as long at the base; anterior margin raised, emarginate, half as long as the base; sides diverging in rather curved lines for about five-sixths of their length, then rounded to the posterior angles; base bisinuate; surface largely but sparsely punctured, with a smooth dorsal line met at the base by a large puncture. Elytra once and two-thirds as long as wide, deeply crenate-striate; the interstices raised, and largely punctured; sides much sinuate below the shoulders, then swelling out and converging to the apex, which is emarginate and somewhat bidentate. Beneath and legs punctured, covered with short grey hairs.

Length 7 lines, breadth 3.
Hab. Australia.

STIGMODERA MACULIPENNIS. (Plate X. fig. 45.)

Capite thoraceque nigris, nitentibus; elytris punctato-striatis, rubris, macula magna in disco posita apiceque nigris; subtus nitida, cyanea et punctata.

Head and thorax black. Elytra miniatous, with a large somewhat triangular black spot on their disk, the sides gradually rounded, and the apex of the same colour; the centre of the discal spot is situated as near as possible in the middle of the elytra. Beneath, legs, and antennæ dark cyaneous blue.

Head finely punctured, deeply channelled between the eyes. Thorax twice as broad as long; anterior margin slightly raised, half as long as the base, with a shallow median lobe; surface shining, finely and regularly punctured, near each posterior angle is a small round punctured fovea. Elytra once and three-quarters as long as wide; punctate-striate, the interstices much raised; sides sinuate below the shoulders, swelling out again behind the middle; apex of each truncate, with a short external tooth. Beneath and legs finely punctured, covered with a very short fine pubescence.

Length 7 lines, breadth 2½.
Hab. New S. Wales.

STIGMODERA ELONGATA. (Plate X. fig. 46.)

Capite et thorace viridi-æneis, punctatis; elytris punctato-striatis, testaceis, sutura late cyanea; subtus cyanea, punctata.

Head cyaneous. Thorax bronzy-green, with cyaneous reflections. Elytra testaceous, with a wide cyaneous stripe down the suture. Beneath, legs, and antennæ cyaneous, with green reflections.

Head punctured, channelled between the eyes. Thorax not quite twice as wide as long at the base; anterior margin nearly straight and raised, half as long as the base; sides regularly rounded; base bisinuate, surface largely punctured, with an impressed dorsal line, and a slight impression on each lateral margin near the posterior angle. Elytra twice as long as wide, punctate-striate; sides subparallel till slightly past the middle, then converging to their apices, each of which is armed with a short, external, somewhat bent-inwards spine. Beneath and legs punctured very sparsely, covered with a few short hairs.

Length 9 lines, breadth 3.

Hab. Swan River.

STIGMODERA JUCUNDA. (Plate X. fig. 47.)

Capite et thorace viridi-aureis, punctatis; elytris flavis, punctato-striatis, apice cyaneo; subtus aureo-viridis.

Head and thorax golden. Elytra flavous, with the apex green. Beneath, legs, and antennæ brassy-green.

Head punctured, channelled between the eyes. Thorax once and three-quarters as wide as long; anterior margin raised and slightly produced, half as long as the base; sides regularly rounded; base with a shallow median lobe; surface deeply and largely punctured, with a smooth dorsal line met at the base by two short very small longitudinal impressions. Elytra not quite twice as long as wide, punctate-striate, sides deeply sinuate above the middle, apices largely rounded. Beneath and legs punctured, with a short white pubescence.

Length 8 lines, breadth 3 lines.

Hab. Australia.

STIGMODERA BIMACULATA. (Plate X. fig. 48.)

Capite thoraceque cupreis, punctatis; elytris testaceis, punctato-striatis, utrinque macula parva post medium posita apiceque nigris; subtus cuprea, abdomine flavo.

Head and thorax cupreous. Elytra testaceous, with a small round spot on each, just behind the middle, and the apex black. Beneath of thorax, breast, and legs and antennæ cupreous. Abdomen flavous.

Head punctured, excavated between the eyes; there is also an impression on each side between the excavation and the eye, joining the former near the top of the forehead. Thorax, at the base, once and a half as broad as long; anterior margin produced in the centre, half as long as the base; sides diverging in nearly straight lines for not quite two-thirds of their length, then converging in rather emarginate lines to the posterior angles; base with a shallow median lobe; surface shining, deeply punctured, with two smooth irregular transverse spaces near the anterior margin, and two smaller longitudinal ones near the base; dorsal line widely impressed and deeply punctured; near the posterior angles on each side is a slight rugosely punctured fovea. Elytra twice as long as wide, punctate-striate, shoulders rather prominent, sides sinuate above the middle, apex of each with a sharp external spine and a small sutural tooth. Beneath and legs punctured, slightly pubescent.

Length 7 lines, breadth 2½ lines.

Hab. North-west Australia.

STIGMODERA TRIMACULATA. (Plate X. fig. 49.)

Capite nigro; thorace flavo, macula nigra ad basin posita; elytris flavis, punctato-striatis, macula utrinque post medium apiceque nigris; subtus cyanea.

Head black. Thorax and elytra testaceous; the former with an oval black spot in the centre of the base; the latter with a transverse spot on each behind the middle and the apex of the same colour. Beneath and legs and antennæ cyaneous, the sides of the thorax excepted, which are testaceous.

Head deeply punctured, with a deep incision to about its middle between the eyes. Thorax once and two-thirds as broad as long at the base; anterior margin slightly raised, emarginate, scarcely half as long as the base; sides diverging rapidly for two-thirds of their length, then converging to the posterior angles; base with a narrow small median lobe; disk transversely raised; surface finely punctured, dorsal line marked by a deep longitudinal incision near the base. Elytra not quite twice as long as wide, punctured and striated; sides sinuate above the middle; apex of each armed with an external spine. Beneath and legs punctured, covered with very short white hairs.

Length 7 lines, breadth 2¾.

Hab. North-west Australia.

STIGMODERA PRODUCTA. (Plate X. fig. 50.)

Capite thoraceque æneo-viridibus, nitentibus, hujus disco linea dorsali fortiter impresso; elytris punctato-striatis, nigris, utrinque tribus maculis testaceis, horum marginibus externis sanguineis; subtus ænea, pedibus læte cyaneis.

Head and thorax bronzy. Elytra black, with greenish reflections, with an irregularly triangular spot above the shoulder, a somewhat oval one not quite touching it, situated about a third of the entire length of the elytra from their base, and a large lateral one produced near its upper extremity, across about three-quarters of the elytron, flavous; the exterior margins of this and the humeral spot are sanguineous. Beneath bronzy green, legs and antennæ ceruleous.

Head finely punctured, channelled between the eyes. Thorax at the base once and two-thirds as broad as long; anterior margin elevated, nearly straight, half as long as the base; sides much rounded; base with a deep central lobe; surface minutely punctured, disk with a deeply impressed dorsal line, widest and deepest at the base; on each side near the posterior angle is a small elongate impression. Elytra twice as long as wide, punctate-striate, the interstices very closely and finely punctured; the third interstice much raised and rounded; shoulders rather prominent; sides sinuate below them, greatly produced and attenuated to the apex, which terminates in a short external spine. Beneath and legs punctured, with a short golden pubescence.

Length 6 lines, breadth 2.

Hab. West Australia.

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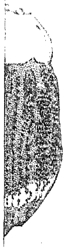

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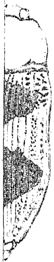

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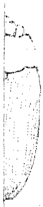

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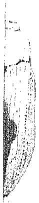

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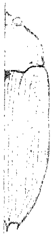

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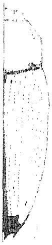

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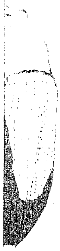

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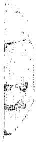

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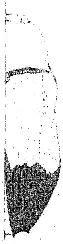

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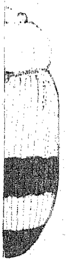

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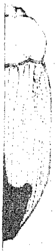

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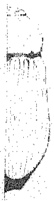

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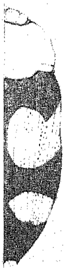

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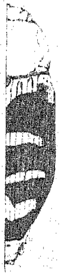

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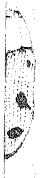

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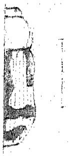

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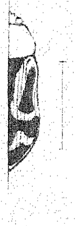

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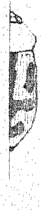

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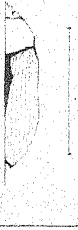

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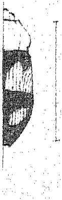

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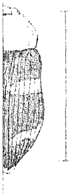
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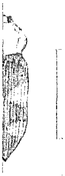
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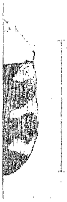
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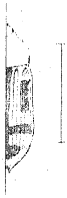
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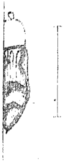
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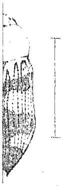
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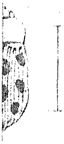
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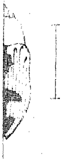
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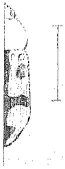
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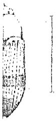
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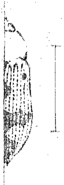
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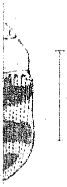
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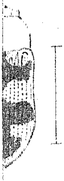
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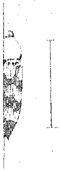
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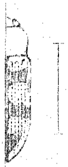
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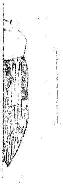
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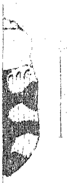
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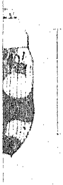
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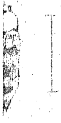
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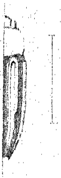
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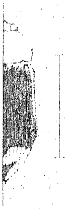
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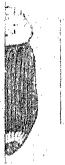
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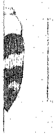
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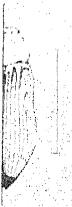
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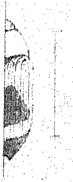
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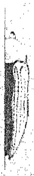
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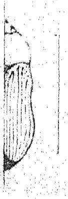
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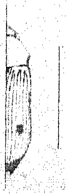
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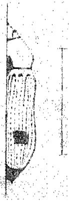
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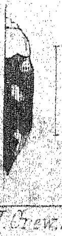
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